AMTRAK SUNNYSIDE YARD (DAR SITE ID #102)

Address:	39-29 Honeywell Street, Queens, New York 11101
Tax Lot Parcel(s):	Queens Block 183 Lots 1, 332, and 345; Queens Block 214 Lots 1, 68, and 100; Queens Block 239 Lots 1 and 130; Queens Block 270 Lots 1 and 2.
Latitude:	40.748641
Longitude:	-73.93161
Regulatory Programs/ Numbers/Codes:	NYSDEC Site ID No. 241006, ASF No. 2-6304-01396/00001, IWD Permit No. 08-P3069, RCRA No. NYD078516895 and NYR000094318, USEPA ID No. 1008388005, 33 reported spills (see Section 7.3), PBS No. 2-603806, 2-603869, and 2-323497
Analytical Data Status:	☐ Electronic Data Available ☒ Hardcopies only ☐ No Data Available

1 SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN (COPCs) TRANSPORT PATHWAYS TO THE CREEK

The current understanding of the transport mechanisms of COPCs from the uplands portions of the Amtrak Sunnyside Yard site (site) to Newtown Creek is summarized in this section and Table 1 and supported in the following sections.

Overland Transport

The site is located over 1,000 feet from Dutch Kills, a tributary of Newtown Creek. It lies in a topographically depressed area with ground elevations ranging from 10 to 15 feet below the surrounding land surface (Roux Associates 2005). Overland surface runoff may have historically transported eroded surface soils and COPCs from historical spills and leaks that occurred throughout the site to the former Dutch Kills Creek that historically extended to the site. The site is underlain by two separate sewer systems, which combined with the topography, serve to strongly influence current drainage at the site (Roux Associates 2005). This pathway is historically complete; however, this is not a currently complete pathway.

Bank Erosion

The site is currently not adjacent to Newtown Creek or associated waterways. This is not a complete historical or current pathway.

Groundwater

Groundwater contamination detected on the site has been divided into four distinct plumes; a nonaqueous phase liquid (NAPL) plume in OU-3 near the former engine house, the North Plume, the West of Honeywell Plume, and the Southeast Plume (NYSDEC 2010). A plume of NAPL composed primarily of fuel oil, but also containing polychlorinated biphenyls (PCBs), is being remediated in the northern portion of the site. The other three plumes are composed of chlorinated volatile organic compounds (CVOCs), benzene, toluene, ethylbenzene, and total xylenes (BTEX) and/or methyl tert-butyl ether (MTBE; NYSDEC 2010). All three plumes are believed to be sourced off site, and to have migrated on site (NYSDEC 2010). Groundwater flow paths are to the west across the site. New York State Department of Environmental Conservation (NYSDEC) determined in the record of decision (ROD) for saturated soil and groundwater that none of the plumes are contributing to contamination in Newtown Creek (NYSDEC 2010). This pathway is historically and currently complete.

Overwater Activities

The site is currently not adjacent to Newtown Creek and associated waterways. This is not a complete historical or current pathway.

Stormwater/Wastewater Systems

This site is within both the Newtown Creek Water Pollution Control Plant (WPCP) and the Bowery Bay WPCP sewersheds. The sewer system at the site consists of two separate subsystems. The "primary" system (also known as Payntar Avenue System) is a combined sewer designed to receive sanitary and stormwater drainage from the majority of site. This system ultimately discharges to the Bowery Bay WPCP, and does not impact Newtown Creek. The "secondary" system, which serves a relatively small area of the western portion of the site, was designed to receive only stormwater. Historically, this stormwater likely discharged directly to Dutch Kills. Stormwater discharges from the secondary system now flow into a combined municipal sewer system. When the combined flows exceed the

system's capacity, untreated combined sewer overflows (CSOs) are discharged to Dutch Kills at Outfall BB-026 (Roux Associates 2005).

The direct discharge of stormwater and wastewater pathway is potentially historically complete; however, there is insufficient evidence to make a current pathway determination. The sewer/CSO pathway is historically complete and potentially currently complete.

Air Releases

The site has an Air State Facility Permit covering volatile organic compounds (VOCs) and combustibles. Analytical results for a very limited number of outdoor and indoor air samples did not exceed New York State Department of Health (NYSDOH) air guidance values (NYSDOH 2006). There is insufficient evidence to make a historical or current pathway determination.

2 PROJECT STATUS

In the 1980s, NYSDEC listed the Sunnyside Yard as a "Class 2" site in the State Registry of Inactive Hazardous Waste Disposal Sites (IHWDS). As a result of this listing, NYSDEC issued an Order on Consent in 1989 between NYSDEC and Amtrak and New Jersey Transit Corporation (NJTC) No. W2-0081-87-06, which required Amtrak to conduct remedial investigations and a health-based risk assessment (Roux Associates 1997a). The site is listed as a Resource Conservation and Recovery Act (RCRA) large quantity generator (EDR 2010).

Activity		Date(s)/Comments
Phase 1 Environmental Site Assessment	☐	
Site Characterization	☒	Limited Site Characterization completed in December 1997 for proposed new building construction.
Remedial Investigation	☒	RI was completed in Phases dated February 1992, February 1995, May 1996,

Activity		Date(s)/Comments
Remedy Selection	☒	Site divided into 6 Operable Units (OUs). Remedies have been selected for: • OU-1 – ROD issued August 1997 • OU-2 – ROD issued November 1997 • OU-3 – ROD issued March, 2007 • OU-4 – ROD issued March 2009 • OU-6 – ROD issued March 2010
Remedial Design/Remedial Action Implementation	☒	• OU-1 – Remedial Design submitted October 1997 • OU-3 – Remedial design submitted October 2007 • OU-4 – Remedial action work plan under review
Use Restrictions (Environmental Easements or Institutional Controls)	☒	Institutional controls/environmental easements were put in place for OUs 1, 3, 4 and 6
Construction Completion	☒	Construction was completed for OU-1 in April 1998
Site Closeout/No Further Action Determination	☒	NFA was assigned to OU-2 and OU-6

Notes:
NFA – no further action
OU – operable unit
RI – Remedial Investigation
ROD – record of decision

3 SITE OWNERSHIP HISTORY

Respondent Member: ☐ Yes ☒ No

Owner	Years	Occupant	Types of Operations
Pennsylvania Railroad Company	1903 – 1966	Pennsylvania New York and Long Island Railroad Company becomes the Pennsylvania Tunnel and Terminal Railroad Company, a subsidiary of the Pennsylvania Railroad Company	Classification, cleaning and storage of passenger railroad cars
	1910 – 1966	Long Island Railroad Company, a subsidiary of the Pennsylvania Railroad Company	Railroad tracks
Pennsylvania New York Central Transportation Company (New	1966 – 1976		
	1966 – present	Long Island Railroad/	

Owner	Years	Occupant	Types of Operations
York Central merges into the Pennsylvania Rail Road Company)		Metropolitan Commuter Transportation Authority	
National Railroad Passenger Corporation (aka Amtrak)	1976 – present		Railroad storage and maintenance facility

4 PROPERTY DESCRIPTION

The site is located in an urban area in the City and County of Queens, New York (see Figure 1). The site is not located adjacent to Newtown Creek or associated water bodies, and does not directly discharge to the creek. The East River is located approximately 1 mile to the west of the property and Dutch Kills, a tributary of Newtown Creek is located about 0.2 miles south of the site. The site is a generally flat area with a gentle slope to the west, and lies in a topographically depressed area with ground elevations ranging from 10 to 15 feet below the surrounding land surface (Roux Associates 2005). The site consists of a railroad maintenance and storage facility for Amtrak and NJTC, and occupies approximately 133 acres (Roux Associates 2005). The surface appears to be a mix of paved and gravel covered areas, and the topography of the site is greatly influenced by the large number of railroad tracks and bulkhead areas.

The site lies within a manufacturing zoning district and surrounding land use includes a combination or commercial, light industrial, and residential uses. The site is located close to five other environmentally regulated sites (see Figure 1); Outlet City to the north, and New York City Transit (NYCT)-Kisco Lot, United Envelope, Con Edison – Newtown Substation, and Remco Maintenance, LLC, to the south.

Two sewer systems were originally constructed with a primary system located beneath the main section of the site, and a secondary system located beneath a small western portion of the site (Roux Associates 2009). The primary system receives both sanitary wastewater and stormwater, and discharges to the Bowery Bay WPCB. The secondary system receives only stormwater. Stormwater discharges from the secondary system now flow into a combined municipal sewer system associated with the Newtown Creek WPCP. When the combined flows exceed that system's capacity, untreated CSOs are discharged to Dutch Kills at Outfall BB-026.

5 CURRENT SITE USE

Amtrak took over the rail yard on April 1, 1976, and continues to operate it as a storage and maintenance facility for railroad rolling stock (Roux Associates 2005).

6 SITE USE HISTORY

The Pennsylvania Tunnel and Terminal Railroad Company (PT and TRR), a subsidiary of the Pennsylvania Rail Road Company (PRR), built the Sunnyside Yard from 1907 to 1910. Beginning in 1903, the PT and TRR acquired land in Long Island City for the yard's construction. A few of the terms of the PT and TRR and New York City agreement included the following:

- New York City to vacate 52 streets
- Cooperation with the construction of bridges over the yard
- A change in grade of 15 streets
- A perpetual easement to New York City on some streets
- The construction of highway bridges (ICC 1918a)

The site was bordered by Northern Boulevard (formerly Jackson Avenue) to the north, 42nd Place to the east, Thompson Avenue to the west, and Skillman Avenue (formerly Meadow Avenue) to the south (NYSDEC 2011). The length of the site was approximately 5,500 feet, 1,550 feet wide on approximately 153 acres and about 37 miles of track. The east end of the yard between Honeywell Street and Thompson Avenue was originally a swamp. Earthen fill was added to about 4 feet in depth, except in a few places that required deeper fill for a stable foundation. The railroads used the yard for the "classification, cleaning, and storage of passenger cars." All trains in the yard were handled by electric power. Yard operations started in November 1910 (ICC 1918a).

The north side of the yard contained tracks for the Long Island Rail Road Company's (LIRR) freight operation and passenger cars (Sanborn 1915; PT and TRRC 1939). The PT and TRR agreed to move the tracks of the LIRR, already in place nearby, to the Sunnyside Yard (Yard). The agreement specified equal or better facilities, some of which would be paid for by both railroads (ICC 1919).

PRR sold the LIRR to the Metropolitan Commuter Transportation Authority in 1966. PRR and New York Central merged in 1966 to make the Pennsylvania New York Central Transportation Company (Moody's 1967). The Yard was sold to Consolidated Rail Corporation (Conrail) on April 1, 1976, who in turn conveyed the property to Amtrak on the same day (U.S. Department of Transportation 2011).

Amtrak's operations in the Yard included the following:

- Central receiving of materials and supplies
- Drum storage
- Empty storage areas
- Locomotive and rail car maintenance and repair
- A railroad car washer
- Gasoline dispensing facilities including a 20,000 gallon underground storage tank (UST)
- Compressor and transformer storage building
- Twelve additional USTs; emptied in 1989 (Roux Associates 1992)

7 CURRENT AND HISTORICAL AREAS OF CONCERN AND COPCs

The current understanding of the historical and current potential upland and overwater areas of concern at the site are summarized in Table 1. The following sections provide brief discussions of the potential sources and COPCs at the site requiring additional discussion.

7.1 Uplands

Several areas of concern were identified based on historical site activities, as indicated in the Remedial Investigation (RI) conducted for the site (Roux Associates 1992). Attachment 1 depicts historical and current areas of concern at the site, including former empty drum storage, underground/aboveground storage tanks, general storage, transformer storage, fuel oil tanks, gas tanks, former car wash area, the material control (site receiving) area, rail yard maintenance buildings, and compressor area on the site (Roux Associates 1992). In addition, operation of the rail yard would occasionally result in spills throughout the yard while rail cars were stationary along sidings. Operations at the site included the regular use of materials such as fuel oil, diesel fuel, gasoline, dielectric and hydraulic fluids, and other materials associated with the care and maintenance of railroad cars.

After completion of the site-wide RI, the site was subsequently divided into six operable units (OUs; see Attachment 2) and work progressed with feasibility studies for each of the areas of concern requiring remediation. The OUs described below were established to facilitate construction activities at the site while still addressing site-wide remedial efforts (Roux Associates 1997a):

- Operable Unit 1 (OU-I): Designated as the soils above the water table within the footprint of the proposed High Speed Transit Facility (HSTF) Service and Inspection (S&I) Building.
- Operable Unit 2 (OU-2): Designated as the soils above the water table within the footprint of the HSTF S&I Building ancillary structures (i.e., the access road and utilities route, the parking area, the construction easement area that surrounds the building, and the construction lay down area).
- Operable Unit 3 (OU-3): Designated as the soils and separate-phase petroleum accumulation above the water table in Area 1 (Engine House) of the site, as defined in the Phase I RI.
- Operable Unit 4 (OU-4): Designated as the soils above the water table in the remainder of the site.
- Operable Unit 5 (OU-5): Designated as the sewer system (water and sediment) beneath the site.
- Operable Unit 6 (OU-6): Designated as the groundwater and saturated soil beneath the site.

Thirty-seven tanks have been identified under Petroleum Bulk Storage (PBS) Nos. 2-603806, 2-603869, and 2-323497. According to the active PBS No. 2-323497, the site has one in-service UST and eight in-service aboveground storage tanks (ASTs).

Tank ID	Date Installed	Tank Status	Tank Location	Capacity (gallons)	Product
PBS No. 2-603806 and 2-603869 (Expired)					
VFA-001	NR	Administratively closed 01/01/99 – Closed in place 12/01/98	UST	750	Gasoline
VFA-002	NR	Administratively closed 01/01/99 – Closed in place 12/01/98	UST	750	Gasoline

Tank ID	Date Installed	Tank Status	Tank Location	Capacity (gallons)	Product
VFA-003	NR	Administratively closed 01/01/99 – Closed in place 12/01/98	UST	750	Gasoline
PBS No. 2-323497 (Expires 08/23/13)					
A02	07/01/63	In service	UST	20,000	No. 2 fuel oil
A03	06/01/98	In service	AST	500	Waste oil/used oil
A04	06/01/98	In service	AST	500	Waste oil/used oil
A05	06/01/98	Closed-Removed 08/01/08	AST	500	Waste oil/used oil
A06	02/01/99	In service	AST	2,000	Waste oil/used oil
A07	11/01/02	In service	AST	5,000	Diesel
A08	12/01/04	In service	AST	2,000	Diesel
A09	10/15/05	In service	AST	5,000	Kerosene (No. 1 fuel oil)
A10	06/01/00	In service	AST	2,000	Waste oil/used oil
A11	06/01/00	In service	AST	1,000	Other
B01	NR	Closed prior to 03/91	UST	12,000	No. 2 fuel oil
B02	NR	Closed prior to 03/91	UST	12,000	No. 2 fuel oil
B03	NR	Closed prior to 03/91	UST	12,000	No. 2 fuel oil
B04	NR	Closed prior to 03/91	UST	10,000	No. 2 fuel oil
B05	NR	Closed prior to 03/91	UST	10,600	No. 2 fuel oil
B06	NR	Closed prior to 03/91	UST	8,300	No. 2 fuel oil
B07	NR	Closed prior to 03/91	UST	11,000	No. 2 fuel oil
B08	NR	Closed prior to 03/91	UST	17,600	No. 2 fuel oil
B09	NR	Closed prior to 03/91	UST	8,200	No. 2 fuel oil
C01	NR	Closed-Removed 11/01/97	UST	500	Empty
C02	NR	Closed-Removed 11/01/97	UST	2,000	Empty
C03	NR	Closed prior to 03/91	UST	1,000	Gasoline
C04	NR	Closed prior to 03/91	UST	1,000	Gasoline
C05	NR	Closed prior to 03/91	UST	1,000	Gasoline
C06	NR	Closed prior to 03/91	UST	1,000	Gasoline
C07	NR	Closed prior to 03/91	UST	1,000	Gasoline

Tank ID	Date Installed	Tank Status	Tank Location	Capacity (gallons)	Product
C08	NR	Closed prior to 03/91	UST	1,000	Gasoline
C09	NR	Closed prior to 03/91	UST	1,000	Gasoline
C10	NR	Closed prior to 03/91	UST	1,000	Gasoline
C11	NR	Closed prior to 03/91	UST	1,000	Gasoline
C12	NR	Closed prior to 03/91	UST	1,000	Gasoline
C13	NR	Closed prior to 03/91	UST	1,000	Gasoline
C14	NR	Closed prior to 03/91	UST	1,000	Gasoline
NVFA-001	04/01/99	Closed-Removed 03/18/09	UST	3,000	Gasoline

Notes:
AST – aboveground storage tank
PBS – petroleum bulk storage
UST – underground storage tank

COPCs associated with historic and current operations at the site include PCBs, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), VOCs, semi-volatile organic compounds (SVOCs), petroleum hydrocarbons, and metals (NYSDEC 1997a).

7.2 Overwater Activities

The site is not adjacent to Newtown Creek.

7.3 Spills

Releases have occurred at the site associated with historical and recent fueling operations, maintenance activities, and damage to train-mounted transformers (NYSDEC 1997b). Many of these releases were undocumented because they occurred prior to any formal spill prevention and reporting system or they were simply not documented. These spills have occurred in designated areas and elsewhere at the site. At least 33 spills have been documented in the New York State spill system. These spills are primarily documented releases related to broken machinery (e.g., fuel, hydraulic lines, or transformers) and tank failures reported during inspection on site (see following table; EDR 2010). COPCs associated with historical spills at the site include: PCBs, cPAHs, VOCs, SVOCs, and petroleum hydrocarbons (NYSDEC 1997a).

NYSDEC Spill No.	Spill Date	Close Date	Material Spilled	Remarks
613010	03/03/07	03/05/07	Hydraulic oil	Approximately 880-100 gallons spilled onto asphalt/concrete; no waterways impacted and was cleaned
9013163	03/23/91	03/14/03	No. 2 fuel oil	20,000-gallon tank failed and contractor will pump tank; does not meet any cleanup requirements
9207333	01/01/91	11/24/03	--	Cleaning/abandonment in place of 14, 20,000-gallon underground storage tanks
8703955	08/12/87	08/12/87	PCB oil	Fire on locomotive carrying transformer
103793	07/10/01	06/26/03	Cleaning chemicals/products	Leak from either pipe or tank of low pH car wash fluid; leak found while repairing tank and contractor called to cleanup area where ground was impacted.
8503066	11/27/95	01/09/08	Petroleum; waste oil	Diesel waste oil filled a sump pump and overflowed into combined sewers; 300 yard diameter pond of oil discovered
9903705	06/26/99	--	Unknown petroleum	Evidence of old spill was noticed during excavation at site
8602016	06/24/86	06/24/86	PCB oil	Source of spill was locomotive when transformer oil burped out of transformer due to product expansion. Product did not reach ground
0200853	04/20/02	10/17/03	Hydraulic oil	Broken hose on loader
9811804	12/18/88	11/24/03	Gasoline	During tank removal contaminated soil identified next to fill lines
0109691	01/05/02	11/24/03	Hydraulic oil	--
8604461	10/12/86	10/12/86	PCB oil	Spill from railroad car transformer
8607789	03/20/87	03/23/87	PCB oil	Train caught on fire and transformer oil was spilled. Later determined to not contain PCBs
8607815	03/20/87	11/24/03	PCB oil	Fire in locomotive may involve 60,000 ppm PCB transformer
9102570	06/04/91	06/04/91	LPG	Leak from tank car. Spill was consolidated with Spill #8503066
9113048	03/25/92	03/25/92	PCB oil	Transformer overheated oil on soil and sorbent applied. Cleanup confirmed
	07/02/98	08/27/96	Transmission fluid	Small railroad tie fire and nearby drum spilled

NYSDEC Spill No.	Spill Date	Close Date	Material Spilled	Remarks
	03/09/99	11/24/03	Transformer oil	Faulty seal on equipment and leaked material identified as containing PCBs
108953	12/08/01	03/10/03	Diesel	Fuel line accidently broke
303007	06/21/03	08/29/03	Hydraulic oil	Hose on crane failed
401755	05/14/04	11/20/07	No. 2 fuel oil	Leaking bad fill pipe
1112990	02/13/12	02/14/12	Kerosene (No. 1 fuel oil)	5 gallons due to equipment failure
0009184	11/08/00	11/27/03	Hydraulic oil	100 gallons to soil due to rail road car equipment failure
0000814	04/20/00	11/24/03	Transmission fluid	10 gallons to soil due to commercial vehicle equipment failure
9814658	03/09/99	11/24/03	Transformer oil	1 gallon to soil due to equipment failure
9804210	07/02/98	08/27/98	Transmission fluid	25 gallons to soil caused by drum spill
0812034	02/05/09	02/18/09	Diesel	15 gallons to blacktop due to overfill of fuel truck
0502669	06/06/05	07/11/05	Diesel	70 gallons to soil due to equipment failure
0502128	05/23/05	06/07/05	Hydraulic oil	10 gallons to soil due to equipment failure
0712819	03/06/08	03/07/08	Hydraulic oil	5 gallons to soil due to human error while installing transformer
0009462	11/17/00	02/24/03	No. 2 fuel oil	30 gallons to soil due to equipment failure
0808975	11/09/08	11/13/08	Diesel	15 gallons due to overfill caused by human error

Notes:
NYSDEC – New York State Department of Environmental Conservation
PCB – polychlorinated biphenyl
ppb – parts per billion
ppm – parts per million

8 PHYSICAL SITE SETTING

8.1 Geology

The site is underlain by the following geologic units in order of increasing depth: fill, wetland deposits, Upper Pleistocene glacial deposits, and crystalline bedrock (NYSDEC 2007). Strata in the area gently dip to the southeast, following the topography of the bedrock surface (Roux Associates 2005). Fill activities, which were part of major topographic changes engineered at the site, occurred during construction in the early 1900s. The fill found at the surface of the site is predominantly comprised of reworked glacial

deposits (unstratified sand, silt, clay, and gravel) and railroad ballast, with lesser amounts of ash, cinders, and construction debris. With the exception of paved areas, buildings, and vegetated areas, the railroad ballast is ubiquitous at the surface throughout the site (Roux Associates 2005).

The Upper Pleistocene glacial deposits consist mainly of ground moraine deposits; unstratified, poorly sorted mixtures of sand, silt, clay, and gravel (Roux Associates 2005). In addition, a cobble layer was encountered in three deep soil borings drilled in the western portion of the site. This unit may represent a relict stream channel that was formed by glacial meltwaters (Roux Associates 2005). One borehole was drilled to the bedrock surface beneath the site. In this soil boring, bedrock was encountered at a depth of 74 feet below land surface (53 feet below mean sea level). In the southwestern portion of the site, a Holocene wetland deposit was encountered below the fill, but above the Upper Glacial formation. This deposit consisted of organic silty clay and meadow mat (Roux Associates 2005).

During the RI, a comparison was made between historical and current topographical features using a topographic map for western Queens from 1890 (Roux Associates 1995). Comparison with the historical map shows that major topographic changes took place during the initial construction/operation of the railroad yard to bring the site close to its current, generally flat, topographic condition (Roux Associates 2005). Further examination of elevation changes also indicated that in many cases it appears the surface elevation decreased from 1890 to present. As a result, the glacial deposits encountered throughout the site (and thought to be native fill) may in fact be native to the site. Two surface-water bodies were also indicated on the 1890 map; a wetland near the northeast corner of the site and a stream (Dutch Kills) shown in the northwest corner of the site flowing southeast to Newtown Creek (Roux Associates 2009). Both of these areas were filled in since 1890, presumably by glacial deposits excavated from other areas of the site and their approximate locations are shown in Attachment 3 (NYSDEC 2010; Roux Associates 2009).

During the course of the RI and subsequent smaller investigations completed as part of OU specific feasibility studies, in excess of 150 soil borings were completed with at least three test pits completed at soil boring locations where refusal was encountered.

8.2 Hydrogeology

Groundwater beneath the site occurs under water table (unconfined) conditions. The water table lies between 1 and 25 feet below ground and occurs in either historical fill or the Upper Pleistocene glacial deposits. The saturated Upper Pleistocene deposits comprise the Upper Glacial aquifer (Roux Associates 2009).

Beneath the site, the saturated fill deposits and the shallow upper glacial aquifer are not distinguishable, and are, therefore, collectively referred to as shallow deposits (which contain the water table; Roux Associates 2009). Deeper wells (wells constructed with screen zones set entirely below the water table) at the site are screened approximately 25 feet below the water table, but are still within the upper glacial aquifer (Roux Associates 2009). Saline groundwater is present throughout the southwest portion of the Yard. The occurrence of saline groundwater correlates with the buried Dutch Kills wetland. The sources of these saline conditions are likely salt water intrusion from Dutch Kills and Newtown Creek (Roux Associates 2009).

Groundwater within the shallow deposits flows predominantly west beneath the site (see Attachment 4). However, between Queens Boulevard and Honeywell Street, groundwater flows northerly and northwesterly toward the buried flow path of Dutch Kills Creek and/or the East River. The groundwater flow, as shown in Attachment 4, appear to mimic the topographic contours of the 1890 map, which depict a topographic high (presumably consisting of glacial till) in the area between Queens Boulevard and Honeywell Street, and Dutch Kills Creek flowing through the western portion of the site. Since undisturbed glacial till is much less permeable than reworked glacial till (fill), horizontal flow gradients are expected to be much steeper within the undisturbed deposits (Roux Associates 2009). The water level contours in the western portion of the site parallel the former flow path of Dutch Kills Creek (see Attachment 4), indicating that the buried Dutch Kills stream bed along the western edge of the site remains a groundwater discharge area (Roux Associates 2009).

Water level elevations from the deep wells indicate that groundwater predominantly flows west across the site similar to the water table groundwater flow (see Attachment 5; Roux Associates 2009). The deep groundwater flow also has a northwest component between Queens Boulevard and Honeywell Street. Although a northwest flow component

does exist in the deep groundwater flow map, it is not as well defined as it is on the water table groundwater flow map. This indicates that, similar to shallow water, deep groundwater flow is likely influenced by factors such as site topography and the buried Dutch Kills stream bed; however, this influence is not as apparent (Roux Associates 2009).

Horizontal flow gradients with the shallow deposits at the site range from 0.0001 feet per foot to 0.011 feet per feet (feet/feet) with an average horizontal flow gradient of 0.003 feet/feet (Roux Associates 2009). An average horizontal flow gradient of 0.003 feet/foot was calculated for the deeper deposits as well (Roux Associates 2009). The values for both the shallow and deeper deposits are indicative of a relatively flat water table surface. The vertical gradients for several well pairs were also calculated over the course of several rounds of measurement at the site. The vertical gradient calculations showed that an area near the northeastern corner of the site is a groundwater recharge area (downward gradient), which should be expected given the historical location of a wetland in this area. The vertical gradient changes from downward to upward with proximity to the buried flow path to Dutch Kills and the East River (Roux Associates 2009). Upward gradients located near the northwest portion of the site indicate that this area is likely a discharge zone from the site (Roux Associates 2009).

Over the course of the RI and subsequent additional investigations, a total of approximately 80 monitoring wells were installed and some were later abandoned due to damage or ongoing construction or remediation activities (Roux Associates 2009).

9 NATURE AND EXTENT (CURRENT UNDERSTANDING OF ENVIRONMENTAL CONDITIONS)

9.1 Soil

Soil Investigations	☒ Yes ☐ No
Bank Samples	☐ Yes ☐ No ☒ Not Applicable
Soil-Vapor Investigations	☒ Yes ☐ No

The goals of the RI was to address the nature, extent (including off site) and the potential migration pathways of separate phase petroleum containing low concentrations of PCBs,

which was previously identified in a limited area of the site. The RI was also undertaken to develop hydrogeologic, soil quality and ground-water quality information to determine the nature and extent of any other areas of contamination at the site (Roux Associates 1992, 1995, 1996, 2009). The RI for the site was completed in two main (site-wide) phases (1992 and 1995) after which the site was divided in to six OUs and OU-specific RI's were completed as needed (1997, 2005, 2008, and 2009).

The sampling density completed as part of the RI and subsequent additional sampling conducted under separate feasibility studies, including in excess of 900 surface soil samples, and more than 500 subsurface soil samples from more than 150 soil borings, were submitted to be analyzed from throughout the site. Attachments 6 through 9 show the sampling locations for the four OUs that cover soils on the site. Submitted samples were analyzed for one or more of the following analytes: total petroleum hydrocarbon (TPH), VOCs, SVOCs, pesticides, PCBs, and metals.

9.1.1 Soil Investigations

Surface and subsurface soil samples were collected starting in the late 1980s through 2005 as part of earlier limited investigation activities and the larger RI/Feasibility Study (FS) activities at the site. The sampling results were summarized in a number of reports including the RI (Roux Associates 1992, 1995, 1996) and several separate FS reports, completed after the site was divided into six OUs (Roux Associates 1997a, 1997b, 2005, 2008).

COPCs at the site include site include PCBs, cPAHs, VOCs, SVOCs, petroleum hydrocarbons, and metals (NYSDEC 1997a). Selected results are summarized below from the various soil sampling activities completed at the site.

Analyte	Units	Minimum Concentration	Maximum Concentration
Surface (0 to 2 feet)			
Acetone	mg/kg	0.02	0.35
Carbon Disulfide	mg/kg	0.0044	0.0077
Chloroform	mg/kg	0.0038	0.0038
Methylene Chloride	mg/kg	0.003	0.032
Tetrachloroethene	mg/kg	0.005	0.005
Toluene	mg/kg	0.002	0.0048
Trichloroethene	mg/kg	0.003	0.003
Xylenes (total)	mg/kg	0.0044	0.0044
Total SVOCs	mg/kg	ND	98.5
Total cPAHs	mg/kg	ND	113.1
Aluminum	mg/kg	1,690	9,370
Antimony	mg/kg	1.9	10.7
Arsenic	mg/kg	3.7	45.6
Barium	mg/kg	23	444
Beryllium	mg/kg	0.44	1.9
Cadmium	mg/kg	1.3	9.2
Chromium	mg/kg	11.9	124
Cobalt	mg/kg	2.3	13
Copper	mg/kg	7.8	629
Iron	mg/kg	5,610	91,800
Lead	mg/kg	2.5	7,020
Manganese	mg/kg	36.5	667
Mercury	mg/kg	0.23	23
Nickel	mg/kg	5.6	168
Selenium	mg/kg	0.52	2
Silver	mg/kg	0.56	1
Vanadium	mg/kg	11	97
Zinc	mg/kg	22	1,310
Total PCB Aroclors	mg/kg	ND	25,000
Subsurface (> 2 feet)			
1,2,4-Trimethylbenzene	mg/kg	0.002	0.7
2-Butanone	mg/kg	ND	4.1

Analyte	Units	Minimum Concentration	Maximum Concentration
4-Chlorotoluene+1,3,5-Trimethylbenzene	mg/kg	0.0026	1
Acetone	mg/kg	0.011	0.308
Carbon Disulfide	mg/kg	0.0051	0.017
cis-1,2-Dichloroethene	mg/kg	ND	0.001
Ethylbenzene	mg/kg	0.0013	0.22
Isopropylbenzene	mg/kg	0.0035	0.3
m+p-Xylene	mg/kg	0.0022	0.2
Methylene Chloride	mg/kg	0.0036	0.258
Naphthalene	mg/kg	0.0024	0.55
n-Butylbenzene	mg/kg	0.0014	1.8
n-Propylbenzene	mg/kg	0.0022	0.57
o-Xylene	mg/kg	0.0013	0.59
p-Isopropyltoluene	mg/kg	0.013	0.28
sec-Butylbenzene	mg/kg	0.0052	0.0052
Toluene	mg/kg	0.00046	0.031
Xylenes (total)	mg/kg	0.137	18
Total SVOCs	mg/kg	ND	195.5
Total cPAH	mg/kg	ND	119.2
Aluminum	mg/kg	2,030	11,100
Arsenic	mg/kg	0.73	11
Barium	mg/kg	14	296
Beryllium	mg/kg	0.26	0.63
Cadmium	mg/kg	0.64	3.7
Chromium	mg/kg	1.6	66.3
Cobalt	mg/kg	1.3	11
Copper	mg/kg	4.8	406
Iron	mg/kg	3,080	38,700
Lead	mg/kg	1.4	2,600
Manganese	mg/kg	30.6	1,460
Mercury	mg/kg	0.086	1
Nickel	mg/kg	4.4	25
Selenium	mg/kg	0.22	2
Silver	mg/kg	0.59	1

Analyte	Units	Minimum Concentration	Maximum Concentration
Thallium	mg/kg	ND	0
Vanadium	mg/kg	5.2	46
Zinc	mg/kg	16	763
Total PCB Aroclors	mg/kg	ND	3,532.50
Dieldrin	mg/kg	1.521	1.521
Endrin	mg/kg	1.422	1.422
Heptachlor	mg/kg	0.485	0.485

Notes:
mg/kg – milligram per kilogram
ND – not detected
PCB – polychlorinated biphenyl

The main categories of contaminants that exceeded their respective Standard, Criteria or Guidance (SCG) values were PCBs, lead, and total cPAHs. While VOCs, SVOCs, and other metals were detected across the site in the surface and subsurface, concentrations did not exceed SCG values or were considered to be background (NYSDEC 1997a, 1997b, 2007, and 2009; Roux Associates 1995). In surface and subsurface soils throughout the site, the SCG levels were exceeded, described as follows:

- PCBs – 62 of the approximately 907 surface samples exceeded
- Lead – 56 of the approximately 486 surface samples exceeded
- cPAHs – 32 of the approximately 463 surface samples exceeded
- PCBs – 13 of the approximately 572 subsurface samples exceeded
- Lead – 17 of the approximately 421 subsurface samples exceeded
- cPAHs – 18 of the approximately 413 surface samples exceeded

Many of the exceedances described above were in areas addressed by the interim remedial measure (IRM; see Section 10) and remaining areas were addressed as part of the selected remedies.

9.1.2 Soil Vapor Investigations

A vapor intrusion investigation was conducted at one of the maintenance buildings. The investigation included collecting two sub-slab vapor samples for analysis for VOCs to

evaluate the potential for exposures via soil vapor intrusion (NYSDEC 2010). Fifteen additional soil vapor samples were previously collected on the site as well. The vapor samples and sub slab samples were all collected from areas of the site where buildings were continuously occupied for more than 8 hours a day (Roux Associates 2009).

Analytical results for the outdoor and indoor air samples (see Section 9.5.2) exceeded the sub-slab vapor samples results, indicating that the source of VOC detections in outdoor and indoor air was not from soil vapor intrusion but from an outdoor source (NYSDEC 2010). Select soil vapor and sub-slab sampling results are summarized in the following table:

Analyte	Units	Minimum Concentration	Maximum Concentration
Subsurface Soil Vapor			
1,1,1-Trichloroethane	µg/m^3	ND	6
1,2,4-Trimethylbenzene	µg/m^3	ND	110
1,2-Dichlorobenzene	µg/m^3	ND	10
1,3,5-Trimethylbenzene	µg/m^3	ND	46
1,3-Butadiene	µg/m^3	ND	31
2,2,4-Trimethylpentane	µg/m^3	ND	7
4-Ethyltoluene	µg/m^3	ND	74
Acetone	µg/m^3	ND	140
Benzene	µg/m^3	ND	45
Carbon Disulfide	µg/m^3	ND	40
Chloroethane	µg/m^3	ND	11
Chloroform	µg/m^3	ND	14
Chloromethane	µg/m^3	ND	8.5
Cyclohexane	µg/m^3	ND	59
Dichlorodifluoromethane	µg/m^3	ND	1200
Ethylbenzene	µg/m^3	ND	100
m+p-Xylenes	µg/m^3	ND	110
Methyl Butyl Ketone	µg/m^3	ND	2.5
Methyl Ethyl Ketone	µg/m^3	ND	26
MTBE	µg/m^3	ND	180
n-Heptane	µg/m^3	ND	45
n-Hexane	µg/m^3	8.8	130
o-Xylene	µg/m^3	ND	43

Analyte	Units	Minimum Concentration	Maximum Concentration
Styrene	µg/m^3	ND	21
Tetrachloroethene	µg/m^3	ND	4.3
Toluene	µg/m^3	11	1000
Trichlorofluoromethane	µg/m^3	ND	220
Xylenes (total)	µg/m^3	ND	160
Sub slab			
1,2,4-Trimethylbenzene	µg/m^3	5.4	5.4
2-Butanone (MEK)	µg/m^3	8	9.1
Acetone	µg/m^3	79.3	125
Benzene	µg/m^3	5.8	6.4
Cyclohexane	µg/m^3	5.9	5.9
Dichlorodifluoromethane	µg/m^3	3.5	4.1
Ethanol	µg/m^3	31.7	32.2
Ethyl Acetate	µg/m^3	7.2	8.3
Ethylbenzene	µg/m^3	8.3	9.1
Isooctane	µg/m^3	5.1	6.1
m+p-Xylene	µg/m^3	28	31
Methylene chloride	µg/m^3	2.4	4.9
n-Heptane	µg/m^3	9	11
n-Hexane	µg/m^3	18	18
o-Xylene	µg/m^3	8.3	9.1
t-Butyl Alcohol	µg/m^3	12	13
Tetrachloroethene	µg/m^3	4.7	5.2
Tetrahydrofuran	µg/m^3	6.5	7.4
Toluene	µg/m^3	33	38.1
Trichlorofluoromethane	µg/m^3	2.5	6.2
Xylenes (total)	µg/m^3	36	40

Notes:
µg/m^3 – microgram per cubic meter
MEK – methyl ethyl ketone
ND – not detected

There are no published guidance criteria for sub-slab air samples to compare results to, and there were no exceedances of the indoor and outdoor air guidance values as published by NYSDOH (2006).

9.1.3 Soil Summary

COPCs identified in surface and subsurface soils at the site include PCBs, cPAHs, VOCs, SVOCs, petroleum hydrocarbons, and metals, all at varying concentrations. Of the COPCs sampled, PCBs, lead, and cPAHs were present in site surface and subsurface soil samples at concentrations greater than their respective SCGs. The RI and subsequent investigations completed for individual OUs concluded that major surface and subsurface contamination at the site was limited to areas associated with historical fueling operation, USTs, and repair/maintenance facilities. Smaller areas of impact were identified throughout the site and were likely the result of historical, localized spills associated with railroad operations.

9.2 Groundwater

Groundwater Investigations	☒ Yes ☐ No
NAPL Presence (Historical and Current)	☒ Yes ☐ No
Dissolved COPC Plumes	☒ Yes ☐ No
Visual Seep Sample Data	☐ Yes ☐ No ☒ Not Applicable

One of the objectives of the RI was to define the nature and extent of any contamination in groundwater beneath the site, which were results of historical and current activities at the site (NYSDEC 2010).

9.2.1 Groundwater Investigations

The RI for the site was completed in 1996 (Roux Associates 1992, 1995, 1996) and an additional RI/FS focusing on groundwater was completed in 2010 (Roux Associates 2009). Additional investigations conducted at the site, which also included a groundwater component, include the Focused RI for OU-2 (Roux Associates 1997b), the OU-6 RI (Roux Associates 1999), and the OU-3 RI (Roux Associates 2005).

Approximately 170 groundwater samples have been collected from a series of monitoring wells throughout the site as part of the many investigations conducted on site (see Attachment 3 for monitoring well locations). As part of the groundwater RI, 62 groundwater samples were collected from 52 monitoring wells (24 shallow wells and 28 deep wells) across the site.

All 62 groundwater samples were submitted for Target Compound List (TCL) VOC analysis (NYSDEC 2010). CVOCs along with BTEX and MTBE were detected in groundwater samples collected from the site. Of the ten CVOCs listed in the table below, eight were detected in one or more samples at a concentration in excess of the NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs). Furthermore, of the BTEX compounds and MTBE compounds, three were detected in one or more samples at a concentration in excess of the NYSDEC AWQSGVs (NYSDEC 2010).

A total of 32 groundwater samples were collected from 30 wells (23 shallow wells and seven deep wells) and submitted for analysis for TCL SVOCs. None of the SVOCs detected exceeded their respective AWQSGVs (NYSDEC 2010).

A total of 27 groundwater samples were collected from 25 wells and submitted for target analyte list (TAL) metals analysis. Six of the 23 TAL metals (arsenic, barium, manganese, potassium, copper, and lead) exceeded the background concentrations at least once among eight of the wells. Of these eight wells, manganese and lead exceeded the respective AWQSGVs (NYSDEC 2010).

A total of 34 groundwater samples were collected from 32 wells (23 shallow wells and nine deep wells) and submitted for PCBs analysis. There were no detections of PCBs in groundwater (NYSDEC 2010).

Selected groundwater sampling results are summarized in the following table and shown in Attachments 10 and 11 (shallow and deep groundwater, respectively):

Analyte	Units	Minimum Groundwater Concentration	Maximum Groundwater Concentration
Benzene	µg/L	ND	73
Toluene	µg/L	ND	4.7
Ethylbenzene	µg/L	ND	1.1
Xylenes (total)	µg/L	ND	5.5
1,1,2-Trichloroethane	µg/L	ND	17
1,1-Dichloroethane	µg/L	ND	1.7

Analyte	Units	Minimum Groundwater Concentration	Maximum Groundwater Concentration
1,1-Dichloroethene (total)	µg/L	ND	11
1,2-Dichloroethane	µg/L	ND	8
Chloroform	µg/L	ND	3.5
cis-1,2-Dichloroethene	µg/L	ND	93
Methyl tert-butyl ether	µg/L	ND	660
Tetrachloroethene	µg/L	ND	760
trans-1,2-Dichloroethene	µg/L	ND	61
Trichloroethene	µg/L	ND	24,000
Vinyl chloride	µg/L	ND	18
2-Methylnaphthalene	µg/L	ND	380
Acenaphthene	µg/L	ND	2.9
Benzoic acid	µg/L	ND	2.5
Fluorene	µg/L	ND	2.2
Aluminum	µg/L	ND	8,400
Arsenic	µg/L	ND	11
Barium	µg/L	ND	580
Copper	µg/L	ND	66
Iron	µg/L	ND	29,000
Lead	µg/L	ND	89
Manganese	µg/L	ND	5,200
Zinc	µg/L	160	-160
Total PCB Aroclors	µg/L	ND	ND

Notes:
µg/L – microgram per liter
PCB – polychlorinated biphenyl
ND – not detected

9.2.2 NAPL Presence (Historical and Current)

NAPL, containing PCBs, was identified during the RI in an area of the site where historically, transformers were maintained on locomotives, fueling of locomotives took place, and numerous USTs associated with the repair facility portion of the site were located (NYSDEC 2007). Also known as separate-phase hydrocarbon (SPH), it was determined that this NAPL was present in surface soils, as a potentially mobile plume on top of the water

table, as residual NAPL trapped within soil pores below the water table, and trapped within underground structures associated with former buildings on the site (NYSDEC 2007).

The area of NAPL impacts was limited to OU-3; Attachment 12 shows the occurrence of the mobile NAPL plume. Originally, the NAPL plume occupied approximately 3 acres as shown in Attachment 12 and what is considered the mobile portion of the plume (in 2007) is also shown, which occupies 0.5 acre (NYSDEC 2007). Approximately 9,400 recoverable gallons and 85,000 gallons of unrecoverable NAPL were estimated to be present within the 3-acre historical footprint of the plume (NYSDEC 2007).

At least 65 samples of NAPL were collected from monitoring wells within the plume. Analysis determined the NAPL plume consist of slightly degraded No. 2 fuel oil and PCBs (NYSDEC 2007). NAPL sampling results are summarized as follows:

Analyte	Units	Minimum Concentration	Maximum Concentration
Total PCBs	µg/L	ND	360

Notes:
µg/L – microgram per liter
ND – not detected
PCB – polychlorinated biphenyl

9.2.3 Dissolved COPC Plumes

The distribution of CVOCs detected on the site is defined by three distinct plumes: the North Plume, the West of Honeywell Plume, and the Southeast Plume (see Attachments 10 and 11; NYSDEC 2010). According to NYSDEC, the three CVOC plumes are not attributable to site operations, but rather, are attributable to upgradient, off-site sources (NYSDEC 2010; Roux Associates 2009).

The North Plume extends onto the site from the north and is thought to originate from the Standard Motor Products, Inc. (SMP) site, which lies hydraulically upgradient from the Amtrak Sunnyside Yard on 39th Street between Northern Boulevard and the site (Roux Associates 2009). VOCs at the SMP site were found to have migrated radially outward from the site through both groundwater and stormwater runoff, and CVOCs identified are similar

to those that have been historically detected along the northern boundary of the Amtrak site (Roux Associates 2009). Historical data collected on the Amtrak site indicate that this plume has migrated west (downgradient) along the northern boundary of the site, but has not migrated further south onto the site (Roux Associates 2009).

The West of Hollywood Plume extends onto the site from the south and is thought to originate from the former ACCO Brands, Inc. (ACCO; and/or its predecessors) site located at 32-00 Skillman Avenue (Roux Associates 2009). VOCs at the former ACCO site have been identified migrating off site in the shallow groundwater to the north-northwest towards the Amtrak site. BTEX detections within the plume have been attributed to a gasoline service station with known petroleum impacts to the northwest of the ACCO site (Roux Associates 2009). Historical data collected from monitoring wells on the Amtrak site indicate that the shallow groundwater West of Hollywood plume has increased in width along the southern boundary of the Amtrak site, but has receded in depth and does not travel as far north onto the site as historical data indicates (Roux Associates 2009). Additional monitoring points have confirmed the presence of a deeper plume, which migrates onto the site further to the north than the shallow plume and in fact is detected completely across the site to the north (Roux Associates 2009).

The Southeast plume extends onto the site from the southeast and originates from an unknown, upgradient source located to the south of the site (Roux Associates 2010). Historical data collected on the Amtrak site indicates that the plume footprint has not expanded with time. Concentrations in the shallow groundwater portion of this plume have decreased over time while concentrations in the deeper plume have increased (Roux Associates 2009).

9.2.4 Groundwater Summary

Groundwater contamination on the site is summarized in Attachments 10 and 11 (shallow and deep groundwater, respectively). Groundwater contamination detected at the site has been divided into three distinct plumes; the North Plume, the West of Honeywell Plume, and the Southeast Plume (NYSDEC 2010). While there are exceedances of NYSDEC groundwater criteria, all three plumes are composed of CVOCs, BTEX, and/or MTBE and are

believed to be sourced off site, and migrated on site (NYSDEC 2010). There were no detections of PCBs in groundwater and levels of SVOCs and metals did not exceed NYSDEC criteria or were considered to be within the range of background concentrations (NYSDEC 2010).

The NAPL plume present in the northern portion of the site has been undergoing active remediation since 1990 with several IRM actions undertaken to recover NAPL via trenches and wells (see Section 10.2).

9.3 Surface Water

Surface Water Investigation	☒ Yes	☐ No
Stormwater and Wastewater Systems	☒ Yes	☐ No
SPDES Permit (Current or Past)	☐ Yes	☒ No
Industrial Wastewater Discharge Permit (Current or Past)	☒ Yes	☐ No
Stormwater Data	☐ Yes	☒ No
Catch Basin Solids Data	☒ Yes	☐ No
Wastewater Data	☒ Yes	☐ No

9.3.1 Stormwater and Wastewater Systems

Two sewer systems (see Attachment 12) were built at the site during its original construction. One received surface drainage only and discharged directly into Dutch Kills Creek. The other discharged both surface drainage and sanitary sewage to the Webster Avenue (now 37th Avenue) sewer system (Barker, Esq. 1910). Sewer piping was originally constructed of reinforced concrete (ICC 1918b).

Currently, this site is within both the Newtown Creek WPCP and the Bowery Bay WPCP sewersheds. The sewer system at the site still consists of two separate subsystems. The "primary" system (also known as Payntar Avenue System) is a combined sewer designed to receive sanitary and stormwater drainage from approximately 90 percent of the site. The primary sewer system ultimately discharges to the Bower Bay WPCP and does not impact Newtown Creek. The "secondary" system serves approximately 10 percent of the total site area and is located in the southwestern portion of the site. This secondary system is limited

to stormwater (i.e., does not contain sanitary sewage). Stormwater discharges from the secondary system now flow into a combined municipal sewer system. When the combined flows exceed the system's capacity, untreated CSOs are discharged to the head of Dutch Kills at Outfall BB-026.

9.3.2 Industrial Wastewater Discharge Permit

On July 21, 2004, NYCDEP issued an industrial wastewater discharge permit (IWD Permit No. 04-P3069-1) to the site to allow discharge of industrial wastewater from the site into the New York City sewer system (Roux Associates 2009). That permit was modified slightly and reissued on August 20, 2004 (04-P3069-2). An IDW permit is required of businesses/industrials that are classified significant industrial users.

Permit Type	Permit Number	Effective Date	Outfalls	Volume	Frequency-Parameters
Industrial Wastewater Discharge Permit	04-P3069-1 and 04-P3069-2	7/21/04	Manhole 2		Monthly pH sampling; twice yearly sampling for VOCs, SVOCs, priority pollutant metals plus molybdenum and non-polar material

Notes:
SVOCs – semi-volatile organic compound
VOCs – volatile organic compound

9.3.3 Sampling Data

During the RI, it was decided that the site's sewer systems posed a potential for off-site migration of site related COPCs. Sampling of the sewer system was first conducted in 1993 and was limited to PCBs at direction of NYSDEC (Roux Associates 2005). The primary sewer system has been sampled multiple times while the secondary sewer was only sampled once (Roux Associates 2010).

9.3.3.1 Sewer Sediment Sampling Data

A total of 37 sediment samples (34 from the primary and 3 from the secondary) have been collected from manholes during a total of four different sampling events (Roux Associates 2010). Collected samples were analyzed for PCBs only and sampling results are summarized in the following table.

Analyte	Units	Minimum Sewer Sediment Concentration	Maximum Sewer Sediment Concentration
Primary Sewer System			
Total PCBs	µg/kg	170	82,000
Secondary Sewer System			
Total PCBs	µg/kg	490	3,500

Notes:
µg/kg – microgram per kilogram
PCB – polychlorinated biphenyl

Over the course of the four sampling events undertaken, the accompanying sewer system investigation became much wider in scope with measurements of flows and sampling at additional manholes where sediment was discovered. In 1996, the last sampling event for which data was available for review, sediment samples were collected from several manholes of the primary sewer system where the sediment had been previously removed. At these locations, the total PCB results in the newly accumulated sediment were found to have dropped substantially (Roux Associates 2010). Additional sampling was proposed to continue monitoring total PCB concentrations in sewer sediment in a work plan submitted in 2010, but the results are not yet available (Roux Associates 2009).

9.3.3.2 Water Sampling Data

A summary of wastewater sampling results from 2004 through 2009 related to Permit No. 04-3069-2 is shown in the following table along with the performance criteria from NYCDEP. The performance criteria for the permit have not been exceeded during the period of data available for review for this summary (Roux Associates 2010). Samples are collected from a manhole location that is part of the primary sewer system. The secondary system is not part of the permit sampling as it is a stormwater only system at the site and does not receive any industrial wastewater from the site (Roux Associates 2010).

Parameter	Units	Permissible Maximum Concentration at any Given Time	Minimum Discharge Concentration	Maximum Discharge Concentration
Cadmium	µg/L	2,000	3.5 U	3.7
Chromium, Hexavalent	µg/L	5,000	25 U	25 U
Copper	µg/L	5,000	63	590
Lead	µg/L	2,000	4 U	92
Mercury	µg/L	50	0.7 U	0.7 U
Nickel	µg/L	3,000	50 U	50 U
Zinc	µg/L	5,000	50 U	320
Non-Polar Material	mg/L	50	0 U	20

Notes:
µg/L – microgram per liter
mg/L – milligram per liter
U – compound was analyzed for but not detected at the stated concentration

Additional sampling of wastewater and stormwater was required by NYCDEP, included analyses for VOCs, SVOCs, and priority pollutant metals plus Molybdenum (Roux Associates 2010). A total of 93 samples have been collected from the primary sewer system; 36 total PCB samples as part of the RI and 57 as part of IWP sampling requirements. A total of eight samples have been collected from the secondary, stormwater only, sewer system; seven total PCB samples as part of the RI and 1 additional sample collected for comparison to IWP sampling results. Selected sewer water sampling results are summarized in the following tables. Several VOCs, SVOCs, metals, and PCBs were detected in the primary system and only one VOC and select metals were detected in the secondary sewer systems (Roux Associates 2010). The secondary sewer system has had fewer samples collected because it is not part of the required sampling related to the IWP permit. One sample was collected for comparison purposes, but no subsequent sampling was conducted.

Analyte	Units	Minimum Sewer Water Concentration	Maximum Sewer Water Concentration
Primary (combined) Sewer System			
Total PCBs	µg/L	0.2	4.4
2-Butanone (MEK)	µg/L	ND	250
Acetone	µg/L	ND	100
Chlorobenzene	µg/L	ND	3.1
Chloroform	µg/L	1.2 J	7
cis-1,2-Dichloroethene	µg/L	ND	40
Ethylbenzene	µg/L	ND	7.7
Methylene Chloride	µg/L	ND	19
O-Xylene	µg/L	ND	23
Tetrachloroethene	µg/L	ND	29
Toluene	µg/L	ND	360
Trichloroethene	µg/L	ND	80
Xylenes (total)	µg/L	ND	54
2,4,6-Trichlorophenol	µg/L	ND	2 J
2,4-Dichlorophenol	µg/L	ND	3 J
4-Methylphenol sodium salt	µg/L	ND	770
Acenaphthene	µg/L	ND	2.2
Acenaphthylene	µg/L	ND	3 J
Anthracene	µg/L	ND	2 J
Benzo[a]anthracene	µg/L	ND	1.5
Benzo[a]pyrene	µg/L	ND	0.8 J
Benzo[b]fluoranthene	µg/L	ND	1.2
Benzo[k]fluoranthene	µg/L	ND	1 J
Benzoic Acid	µg/L	ND	620
Bis(2-ethylhexyl) phthalate	µg/L	ND	50
Chrysene	µg/L	ND	7 J
Dibenzofuran	µg/L	ND	0.9 J
Diethyl phthalate	µg/L	ND	8
Fluoranthene	µg/L	ND	14
Fluorene	µg/L	ND	16
Naphthalene	µg/L	ND	3.5
Phenanthrene	µg/L	ND	3
Phenol	µg/L	ND	150
Pyrene	µg/L	ND	12

Analyte	Units	Minimum Sewer Water Concentration	Maximum Sewer Water Concentration
Aluminum	µg/L	501	
Barium	µg/L	ND	190
Cadmium	µg/L	ND	7.8
Chromium	µg/L	ND	45.7
Copper	µg/L	54.3	740
Cyanide (Amenable)	µg/L	ND	12
Cyanide	µg/L	ND	12
Iron	µg/L	15,300	15,300
Lead	µg/L	ND	92
Manganese	µg/L	175	
Nickel	µg/L	ND	12.4
Zinc	µg/L	121	652
Secondary (stormwater only) Sewer System			
Total PCBs	µg/L	ND	ND
Xylenes (total)	µg/L	ND	51
Iron	µg/L	33,000	33,000
Lead	µg/L	ND	15.1
Zinc	µg/L	75.5	121

Notes:
µg/kg – microgram per kilogram
MEK – methyl ethyl ketone
ND – not detected
PCB – polychlorinated biphenyl

9.3.4 Surface Water Summary

The site is not located adjacent to Newtown Creek or any waterway; therefore, no creek surface water data has been collected. The sewer system at the site consists of two separate subsystems. The "primary" system is a combined sewer designed to receive sanitary and stormwater drainage from the majority of site and ultimately discharge to the Bower Bay WPCP and does not impact Newtown Creek. The "secondary" system, which serves a relatively small area of the western portion of the site, was designed to receive only stormwater. Historically, this stormwater likely discharged directly to Dutch Kills. Stormwater discharges from the secondary system now flow into a combined municipal sewer system. When the combined flows exceed the system's capacity, untreated CSOs are

discharged to Dutch Kills at Outfall BB-026. Limited sampling of stormwater that could discharge during CSO events to Dutch Kills indicated no detections of PCBs. Investigations of the sewer systems at the site are ongoing.

9.4 Sediment

Creek Sediment Data ☐ Yes ☐ No ☒ Not Applicable

Creek sediment investigation information was not found in reviewed documents. The site is not adjacent to Newtown Creek.

9.5 Air

Air Permit ☒ Yes ☐ No

Air Data ☒ Yes ☐ No

9.5.1 Air Permit

Permit Type	Permit Number	Effective Date	Frequency-Parameters
Air State Facility	2-6304-01396/00001	8/31/01	Facility VOC emissions capped at 22.5 tons per year
			Facility oxides of nitrogen emissions capped at 22.5 tons per year
			Percent sulfur by weight of any distillate fuel oil not to exceed 0.2 percent
			Record keeping for facilities which fire coal or fuel oil
			Combustion installations shall not exceed 20percent opacity except for one 6 minute period per hour
			Solid particulates in emissions limited to 0.15 grains per cubic foot of exhaust
			Record keeping requirements for materials that contain VOCs and equipment used for air cleaning with overall removal efficiency of 80 percent
			Requirement of maximum allowable amount of 3.5pounds of VOC per gallon of coating utilizing air drying or forced air drying

Note:
VOC – volatile organic compound

9.5.2 Air Sampling Data

A vapor intrusion investigation was conducted at one of the maintenance buildings. The investigation included two indoor air samples and one outdoor (ambient) air sample for analysis for VOCs to evaluate the potential for exposures via soil vapor intrusion (NYSDEC 2010).

Analytical results for the outdoor and indoor air samples exceeded the sub-slab vapor samples results, indicating that the source of VOC detections in outdoor and indoor air was not from soil vapor intrusion, but from an outdoor source (NYSDEC 2010). Select air sampling results are summarized in the following table:

Analyte	Units	Minimum Concentration	Maximum Concentration
Indoor and Outdoor Air			
1,2,4-Trimethylbenzene	µg/m^3	4.9	6.4
1,3,5-Trimethylbenzene	µg/m^3	1.6	1.7
2-Butanone (MEK)	µg/m^3	7.7	15
2-Propanol	µg/m^3	6.4	9.3
4-Ethyltoluene	µg/m^3	1.4	1.7
Acetone	µg/m^3	18	73.4
Benzene	µg/m^3	5.8	8
Carbon tetrachloride	µg/m^3	ND	0.69
Chloromethane	µg/m^3	1.8	1.9
Cyclohexane	µg/m^3	5.2	7.6
Dichlorodifluoromethane	µg/m^3	3.6	4
Ethanol	µg/m^3	31.7	45.2
Ethyl Acetate	µg/m^3	1.3	7.9
Ethylbenzene	µg/m^3	10	10
Isooctane	µg/m^3	5.1	7.5
m+p-Xylene	µg/m^3	34	35
Methylene chloride	µg/m^3	1.1	2.8
n-Heptane	µg/m^3	11	12
n-Hexane	µg/m^3	18	27
o-Xylene	µg/m^3	10	10
Propylene	µg/m^3	ND	12
Styrene	µg/m^3	0.55	0.85

Analyte	Units	Minimum Concentration	Maximum Concentration
t-Butyl Alcohol	µg/m^3	7	105
Tetrachloroethene	µg/m^3	5.1	5.5
Tetrahydrofuran	µg/m^3	5.6	9.4
Toluene	µg/m^3	42.6	43.3
Trichlorofluoromethane	µg/m^3	2	2.6

Notes:
µg/m^3 – microgram per cubic meter
MEK – methyl ethyl ketone

There are no published guidance criteria for sub-slab air samples to compare results to, and there were no exceedances of the indoor and outdoor air guidance values as published by NYSDOH (2006).

9.5.3 Air Summary

The site has an Air State Facility Permit that describes standards and practices for use of materials that may contain VOCs and combustibles that contribute to air pollution (NYSDEC 2006). No data was available to review for this summary regarding site compliance with the permit conditions.

Site-wide air sampling data was not found in the material reviewed to prepare this summary, but air sampling data from one area of the site is available. No site-related soil vapor/indoor air COPCs were identified during the RI/FS (NYSDEC 2010). Analytical results for the few outdoor and indoor air samples collected did not exceed air guidance values published by NYSDOH (2006). Impacts from the site to air quality at Newtown Creek are unknown.

10 REMEDIATION HISTORY (INTERIM REMEDIAL MEASURES AND OTHER CLEANUPS)

Investigation and cleanup activities have been occurring since 1997 to address soil and groundwater contamination at the site as agreed upon in the Consent Order with NYSDEC. Amtrak records indicate that there were at least six PCB releases from transformers prior to the Consent Order agreement with NYSDEC, all of which are believed to have been

remediated to 50 parts per million (ppm), the prevailing standard at the time (NYSDEC 1997a). No specific dates or further details about these remediation activities were in the material reviewed for this summary.

10.1 Interim Remedial Measures

10.1.1 NAPL IRMs

Prior to and during the RI, two IRMs were implemented. The first IRM was completed in three phases to address NAPL identified along the northern boundary of the site near Northern Boulevard. The first phase of IRM implementation to address the NAPL began in early 1990 with the installation of three recovery trenches to mitigate the flow of NAPL and begin recovering mobile NAPL (see Attachment 12; NYSDEC 2007). The orientation of the trenches surrounding the Metro Shed are shown in Attachment 13. These trenches were constructed approximately 6 feet below ground surface (bgs) and were filled with gravel and each contained a sump and pump to recover the NAPL. The pumps were connected to one of two 2,000-gallon capacity aboveground tanks. The recovery trenches and sumps spanned the water table to allow the NAPL to accumulate within them (NYSDEC 2007).

The second phase of IRM implementation to address the NAPL began in June 1991 to augment the trench system previously installed. The design for this enhancement was based upon data gathered during the Phase 1 RI (Roux Associates 1992; NYSDEC 2007). The Phase 2 IRM consisted of three 4-inch diameter recovery wells in an area where the NAPL plume was thickest (see Attachment 12; NYSDEC 2007). The recovery wells were outfitted with NAPL recovery pumps and connected to the existing recovery system (NYSDEC 2007). The Phase 3 IRM became operational in February 1999 and consisted of a large interceptor trench constructed through the thickest part of the NAPL plume (see Attachment 13). The trench was installed to a depth such that it would remain functional even during seasonal fluctuations of the water table. The trench contained a 12-inch perforated pipe surrounded by gravel and two large sumps were located in the trench to allow recovery of the accumulated NAPL (NYSDEC 2007). The sumps were then connected to the existing recovery system. One recovery well installed in Phase 2 was abandoned during construction of the trench because it was situated where the trench was to be installed.

As of 2007 the NAPL IRM's had recovered more than 11,500 gallons of product; an estimated 9,400 gallons of recoverable petroleum and 85,000 gallons of residual petroleum remain (NYSDEC 2007).

10.1.2 Soil IRMs

In addition to the NAPL IRMs, other IRMs were completed at the site to address elevated levels in soil in areas where construction activities were occurring. In 1998, an estimated 650 cubic yards (cy) of soil, which exceeded criteria for cPAHs and lead, was removed to make way for new rail track associated with the new High Speed Train-set Facility (HSTF) building along the northern boundary of the site. The excavation was completed at a depth where levels dropped below recommended soil cleanup levels (NYSDEC 2007). A second soil IRM was completed when approximately 835 cy of hydrocarbon-impacted soil was encountered in 1999, while an excavation was open searching for the source of a water leak in OU-3 near the northern boundary of the site (NYSDEC 2007). The excavation caused the water pipe to break and allowed water to come in contact with the impacted soil with NAPL forming on the surface of the water and accumulating in a downgradient utility trench. The water and NAPL were collected for disposal, and analysis revealed high concentrations of total PCBs (2,200 ppm; NYSDEC 2007). Based on those PCB results, 16 soil borings were completed in the area and 27 soil samples were submitted with none exceeding the PCB cleanup level. The hydrocarbon-impacted soil was excavated and disposed of and additional sampling showed that the impacted soil did not extend to the water table (NYSDEC 2010).

10.2 Soil Cleanup

As described previously, there are five OUs that address saturated and unsaturated soils at the site, OU-1 through OU-4, and OU-6. All five of these OUs are now subject to RODs with a remedy selected and in many cases carried out to completion. These OUs are described as follows:

- The first ROD was issued in August 1997 for OU-1 (see Attachment 2). The selected remedy to address soils above the water table in this area was excavation of contaminated soil down to the water table and disposal in a permitted landfill (NYSDEC 1997a). The OU-1 area was the first addressed due to the desire to construct a new building in the rail yard. The remediation of OU-2 was completed in

April of 1998. There were no post-remediation data available in the material reviewed for this summary.

- The second ROD was issued in November 1997 for OU-2 (see Attachment 2). The selected remedy to address soils above the water table in this area was No Further Action (NYSDEC 1997b). During the RI, it was determined that none of the COPCs present in OU-2 exceeded the applicable cleanup levels.
- The third ROD was issued in March 2007 for OU-3 (see Attachment 2). The selected remedy to address soils and NAPL accumulation above the water table included: excavation and off-site disposal of soil contaminated by petroleum hydrocarbons, PCBs, and lead; in situ application of amendments to enhance biodegradation of petroleum contaminated soils in selected areas; excavation and off-site disposal of structures related to the former Engine House inspection pit, three subsurface fuel pump vaults, and nine USTs; removal of water and petroleum hydrocarbon containing sludge from the former Engine House service pit; backfilling of excavated areas with clean soil; and development of a site management plan (NYSDEC 2007). Remediation in this OU is ongoing.
- The fourth ROD was issued in March 2009 for OU-4 (see attachment 2). The selected remedy to address soils above the water table for the remainder of the site (excluding areas covered under RODs for OU-1, OU-2 or OU-3) was excavation of contaminated soils (NYSDEC 2009). The remedial action work plan (RAWP) is under review for this phase of work.
- The fifth ROD was issued in March 2010 for OU-6. The selected remedy to address groundwater and soils below the water table on the entire site was "No Action" (NYSDEC 2010).

10.3 Groundwater Cleanup

The March 30, 2010 ROD for OU-6 was based on the results of the RI and, as indicated above, "No Action" was selected by the NYSDEC for contaminated groundwater at the site (NYSDEC 2010). Groundwater on the site was found to be impacted, but the impacts were from plumes migrating onto the site from upgradient sources (NYSDEC 2010). As part of the ROD, an environmental easement was established limiting the use and development of the property to industrial uses only and establish a site management plan and periodically certify that it is being followed. A part of this plan will include monitoring of groundwater to determine if continued plume migration is occurring (NYSDEC 2010).

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12 ATTACHMENTS

Figures

Figure 1 Site Vicinity Map: Amtrak Sunnyside Yard

Tables

Table 1 Potential Areas of Concern and Transport Pathway Assessment

Supplemental Attachments

Attachment 1 Plate 2: Sunnyside Yard Site Map (Roux Associates 1992)

Attachment 2 Plate 2: Amtrak Yard Layout (Roux Associates 2009)

Attachment 3 Figure 4: Monitoring Well Locations and Historic Surface Water Features (NYSDEC 2010)

Attachment 4 Plate 2: Water Table Contour Map May/June 2008 (Roux Associates 2009)

Attachment 5 Plate 3: Equipotential map for Groundwater in Wells Screened Below the Water Table June/July 2008 (Roux Associates 2009)

Attachment 6 Figure 3: Site Map of Operable Unit 1 (Roux Associates 1997a)

Attachment 7 Figure 3: Site Map of Operable Unit 2 (Roux Associates 1997b)

Attachment 8 Plate 2: Sample Locations (NYSDEC 2007)

Attachment 9 Figure 3: OU-4 Soil Boring Locations (Roux Associates 2008)

Attachment 10 Plate 4: Groundwater Quality at the Water Table May/June 2008 (Roux Associates 2009)

Attachment 11 Figure 8: Groundwater Quality in wells Screened Below the Water Table April through June 2008 (NYSDEC 2010)

Attachment 12 Plate 1: Sewer System Basemap (Roux Associates 2010)

Attachment 13 Figure 11: Locations of Previous and Existing SPH IRMs and Soil IRMs (NYSDEC 2007)

Table 1

Potential Areas of Concern and Transport Pathways Assessment – Amtrak Sunnyside Yard

Potential Areas of Concern	Media Impacted					COPCs														Potential Complete Pathway						
						TPH			VOCs																		
Description of Areas of Concern	Surface Soil	Subsurface Soil	Groundwater	Catch Basin Solids	Creek Sediment	Gasoline-Range	Diesel – Range	Heavier – Range	Petroleum Related (e.g., BTEX)	VOCs	Chlorinated VOCs	SVOCs	PAHs	Phthalates	Phenolics	Metals	PCBs	Herbicides and Pesticides	Dioxins/Furans	Overland Transport	Groundwater	Direct Discharge – Overwater	Direct Discharge – Storm/Wastewater	Discharge to Sewer/CSO	Bank Erosion	Air Releases
Leaks and spills to surface soil	√	√	√	√	?	?	√	√	√	√	--	√	√	?	?	√	√	--	?	?	√	--	√	√	--	?
Off-site Upgradient Facilities	?	√	√	?	?	√	?	?	√	√	√	?	?	?	?	?	?	?	?	?	√	--	?	?	--	?
Maintenance Facility Areas (including Engine House service pit and pump vaults)	√	√	√	√	?	?	√	√	√	√	?	?	√	?	?	?	√	--	?	?	√	--	?	?	--	√
Yard and railroad car transformers	√	√	--	√	?	?	?	√	?	?	?	?	?	?	?	?	√	--	?	?	√	--	√	√	--	?
ASTs/USTs	--	√	√	?	?	√	√	√	√	?	?	√	√	?	?	?	?	--	?	--	√	--	√	?	--	?

Notes:
√ – COPCs are/were present in areas of concern having a current or historical pathway that is determined to be complete or potentially complete.
? – There is not enough information to determine if COPC is/was present in area of concern or if pathway is complete.
-- – Current or historical pathway has been investigated and shown to be not present or incomplete.

AST – aboveground storage tank
BTEX – benzene, toluene, ethylbenzene, and xylene
COPC – constituent of potential concern
CSO – combined sewer overflow
PAHs – polycyclic aromatic hydrocarbon
SVOC – semi-volatile organic compound
TPH – total petroleum hydrocarbon
UST – underground storage tank
VOC– volatile organic compound

Q:\Jobs\110762-01_NewTownCreek\Maps\RI_RemedialInvestigation\Historic_Data_Research\Site Features.Mapbook.mxd ckiblinger 5/23/2012 5:27:47 PM

- USEPA Sample Locations (Surface and Subsurface)
- Shoreline (NYC Dept. of Information Technology, 2006)
- USGS Nat'l Elev. Dataset 5-foot Contours
- Selected Site Property Boundary
- Neighboring Site Property Boundary

Outfall Class

- Direct Discharge
- General
- Highway Drain
- Major Stormwater Outfall
- SPDES
- Storm Drain

NOTES:

1. Outfall Labeling: BB: Bowery Bay; NC(B/Q): Newtown Creek, Brooklyn/Queens; ST: Stormwater.
2. Outfall locations are preliminary, compiled, estimated data based on New York City Department of Environmental Protection (NYCDEP) maps and tabulated data and other resources. Many outfall locations were taken from the New York City Shoreline Survey Program: Newtown Creek Water Pollution Control Plant Drainage Area, NYCDEP, March 31, 2003. Other locations were taken from an excerpt from a similar report from 2008 (the complete report was not included in files available for review). Finally, some outfall locations were inherited from previous Anchor QEA and Newtown Creek Project work. Latitudinal and longitudinal data provided in the 2003 and 2008 NYCDEP reports were rounded to the nearest second. This resulted in potential outfall location discrepancies of up to approximately 200 feet. All outfall locations are currently under field verification.
3. Aerial Photos: New York State Division of Homeland Security and Emergency Services, 2010.
4. Site Boundaries are based on New York City parcels data.
5. Coarse topographic contours are derived from U.S. Geological Survey 10-meter data.

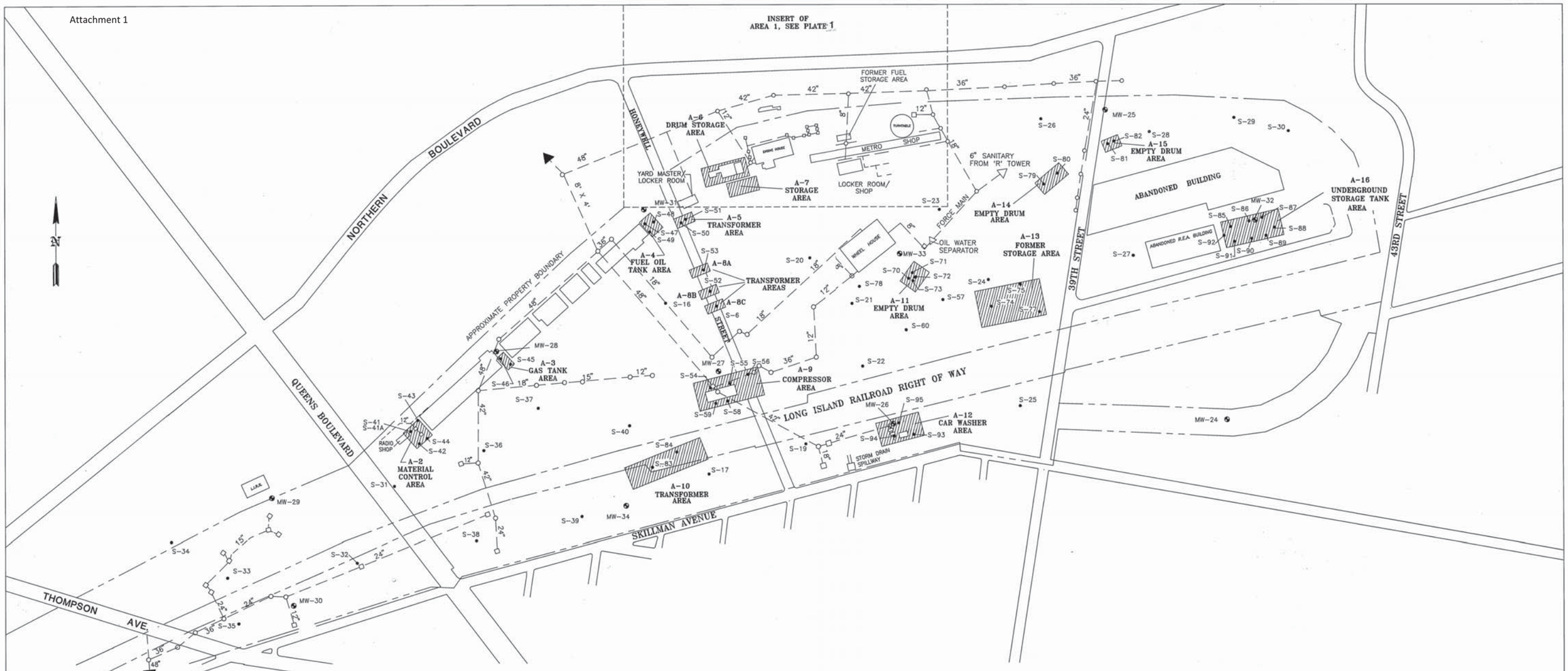
ANCHOR QEA

DRAFT

Figure 1
Site Vicinty Map
Draft Upland Site Summary: Amtrak Sunnyside Yard
Newtown Creek RI/FS

SUPPLEMENTAL ATTACHMENTS

Attachment 1



EXPLANATION

- MW-27 ⊕ MONITORING WELL LOCATION AND DESIGNATION
- S-25 • SOIL BORING LOCATION AND DESIGNATION
- AREAS OF CONCERN
- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE LOCATION OF SEWER, TAKEN FROM ENGINEERING DRAWINGS
- 12" APPROXIMATE DIAMETER OF SEWER
- □ CATCH BASIN
- ○ MANHOLE

0 200 400 FEET

Title: SUNNYSIDE YARD SITE MAP

Prepared For: AMTRAK SUNNYSIDE YARD

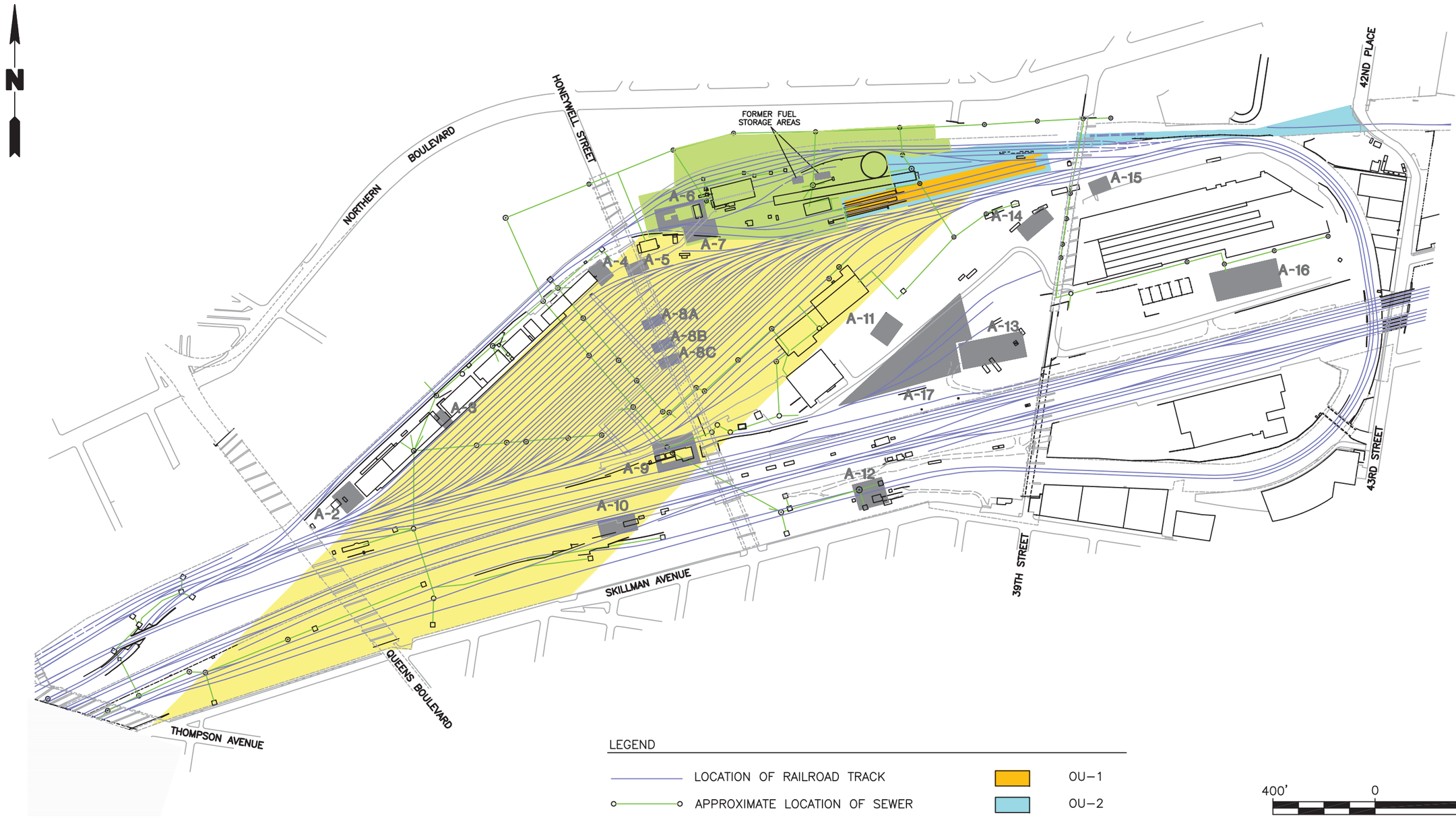
ROUX ASSOCIATES INC
Consulting Ground-Water Geologists & Engineers

Compiled by: B.W. | Date: 2/91
Prepared by: C.L. | Scale: SHOWN
Project Mgr: J.D.D. | Revision: 0
File No: 05509BM4

PLATE 2

NEWT-0091331

Attachment 2



NOTES

1. LOCATIONS OF SEWER COMPONENTS BASED UPON A REVIEW OF AMTRAK–SUPPLIED ENGINEERING DIAGRAMS AND LIMITED FIELD SURVEY.
2. OU–6, GROUND WATER BENEATH THE YARD, IS NOT SHOWN.
3. RI – REMEDIAL INVESTIGATION
4. LIRR – LONG ISLAND RAIL ROAD

LEGEND

- LOCATION OF RAILROAD TRACK
- APPROXIMATE LOCATION OF SEWER
- GRATE COVER CATCH BASIN LOCATION
- SOLID COVER MANHOLE LOCATION
- GRATE COVER MANHOLE LOCATION
- A-2 LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN
- APPROXIMATE PROPERTY BOUNDARY

- OU–1
- OU–2
- OU–3
- OU–4
- OU–5

400' 0 400'

Title:

AMTRAK YARD LAYOUT

OPERABLE UNIT 6 RI/FS REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: H.G.	Date: 11SEP09	FIGURE	
Prepared by: J.A.D.	Scale: AS SHOWN	2	
Project Mgr: H.G.	Office: NY		
File No: AM6511307	Project: 05565Y03		

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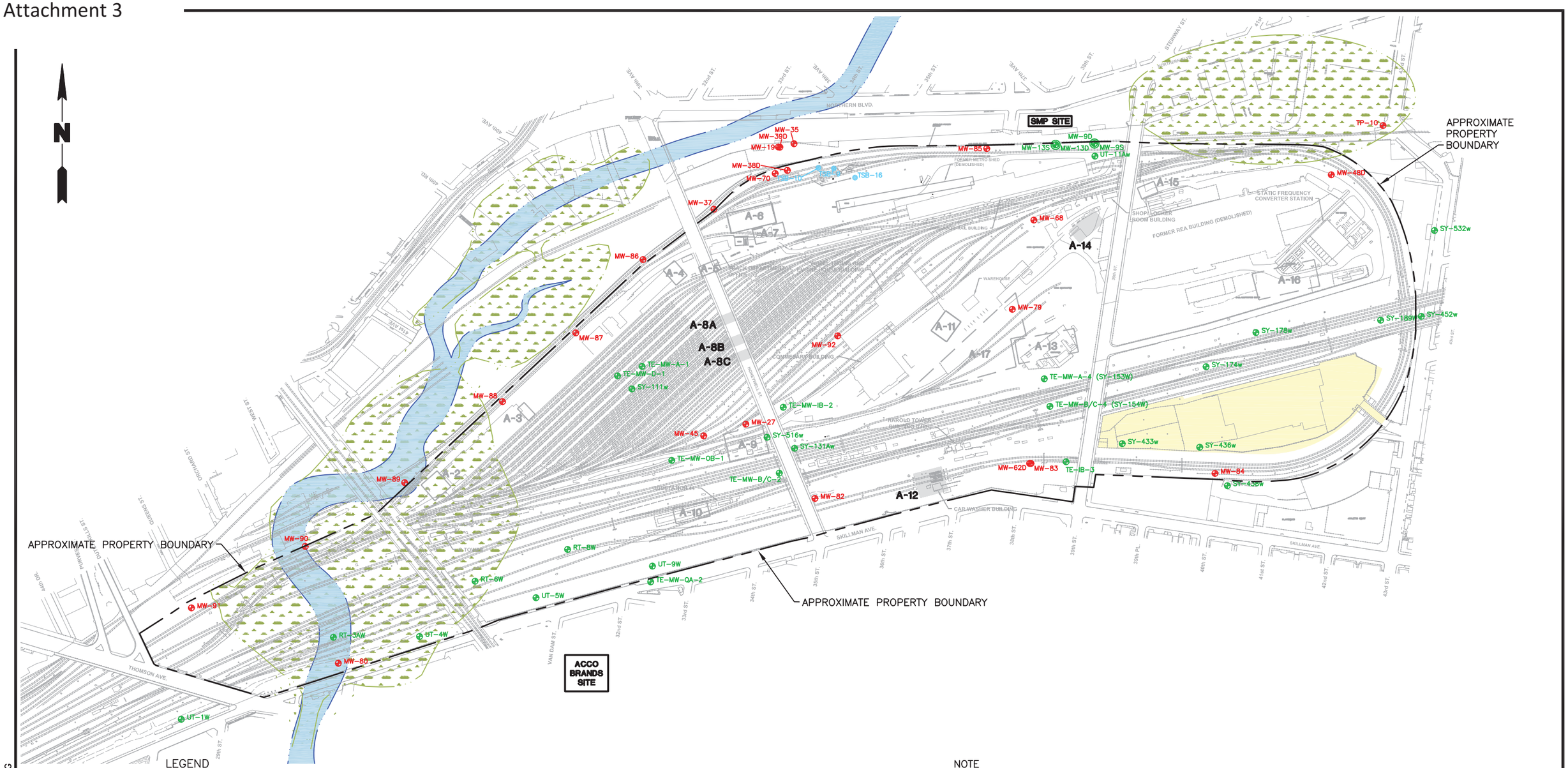
Attachment 3



LEGEND

MW-80	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.
TE-IB-3	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY OTHERS FOR EAST SIDE ACCESS (ESA) PROJECT
MW-13	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL CLUSTER (CONTAINING ONE SHALLOW AND ONE DEEP MONITORING WELL) INSTALLED BY OTHERS AS PART OF THE RI/FS FOR THE STANDARD MOTOR PRODUCTS, INC. (SMP) SITE.
TSB-16	LOCATION AND DESIGNATION OF GEOPROBE™ SOIL BORINGS/ GROUNDWATER SAMPLING POINT FROM OU-3 REMEDIAL INVESTIGATION
— — — —	APPROXIMATE PROPERTY BOUNDARY
A-12	LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN WHERE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES WERE EVALUATED
A-2	LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN THAT DOES NOT REQUIRE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES
	PRIVATE PROPERTY NOT OWNED BY AMTRAK (NOT PART OF OU-6)
	APPROXIMATE 1907 EXTENT OF ORIGINAL WETLANDS
	APPROXIMATE 1890 FLOW PATH OF DUTCH KILLS CREEK

NOTE

WELLS WITH FADED SYMBOLS HAVE EITHER BEEN ABANDONED, DESTROYED, BURIED OR OTHERWISE UNFIT FOR SAMPLING.

400' 0 400'

Title:

MONITORING WELL LOCATIONS AND HISTORIC SURFACE WATER FEATURES

OPERABLE UNIT 6 RECORD OF DECISION
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting and Management

Compiled by: L.D.	Date: 12MAR10	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	4
Project Mgr: H.G.	Project: 05565Y04	
File: AM6511903		

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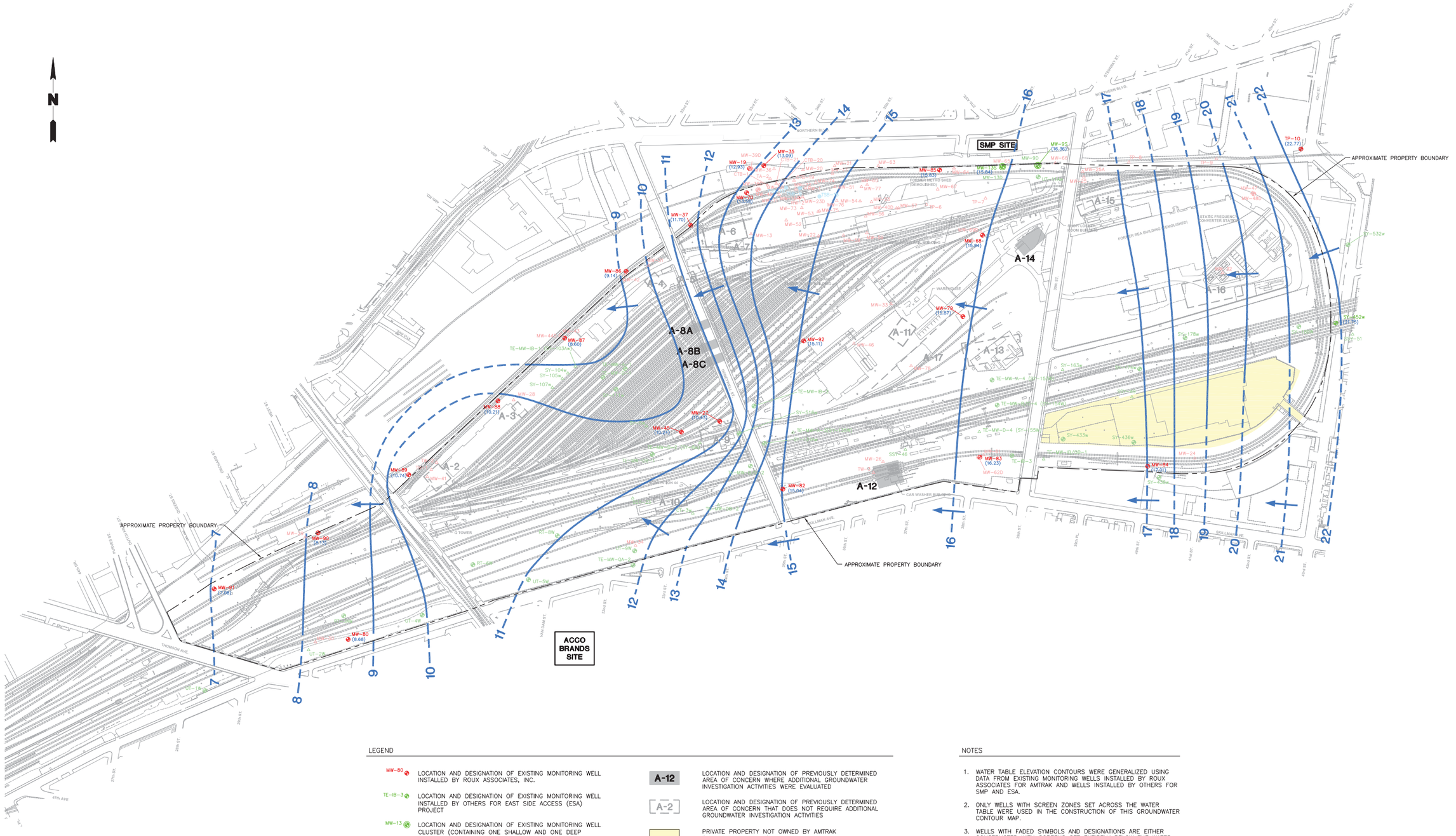
Attachment 4



LEGEND

MW-80	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.
TE-IB-3	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY OTHERS FOR EAST SIDE ACCESS (ESA) PROJECT
MW-13	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL CLUSTER (CONTAINING ONE SHALLOW AND ONE DEEP MONITORING WELL) INSTALLED BY OTHERS AS PART OF THE RI/FS FOR THE STANDARD MOTOR PRODUCTS, INC. (SMP) SITE.
MW-31 △	LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC. THAT IS ABANDONED, DESTROYED, BURIED OR UNFIT FOR SAMPLING
TE-MW-OB-2 △	LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY OTHERS THAT IS ABANDONED, DESTROYED, BURIED OR UNFIT FOR SAMPLING
TSB-16	LOCATION AND DESIGNATION OF GEOPROBE™ SOIL BORINGS/ GROUNDWATER SAMPLING POINT FROM OU-3 REMEDIAL INVESTIGATION
	APPROXIMATE PROPERTY BOUNDARY
A-12	LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN WHERE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES WERE EVALUATED
A-2	LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN THAT DOES NOT REQUIRE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES
	PRIVATE PROPERTY NOT OWNED BY AMTRAK (NOT PART OF OU-6)
(8.68)	WATER TABLE ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
8	ELEVATION OF WATER TABLE IN MAY AND JUNE 2008 IN FEET RELATIVE TO MEAN SEA LEVEL, DASHED WHERE INFERRED
	DIRECTION OF GROUNDWATER FLOW

NOTES

1. WATER TABLE ELEVATION CONTOURS WERE GENERALIZED USING DATA FROM EXISTING MONITORING WELLS INSTALLED BY ROUX ASSOCIATES FOR AMTRAK AND WELLS INSTALLED BY OTHERS FOR SMP AND ESA.
2. ONLY WELLS WITH SCREEN ZONES SET ACROSS THE WATER TABLE WERE USED IN THE CONSTRUCTION OF THIS GROUNDWATER CONTOUR MAP.
3. WELLS WITH FADED SYMBOLS AND DESIGNATIONS ARE EITHER CONSTRUCTED WITH SCREENS SET ENTIRELY BELOW THE WATER TABLE (i.e., DEEP SCREEN ZONES), OR HAVE BEEN ABANDONED, DESTROYED OR BURIED. THESE WELLS WERE NOT USED IN THE CONSTRUCTION OF THIS GROUNDWATER CONTOUR MAP.
4. ELEVATION DATA IS IN FEET RELATIVE TO MEAN SEA LEVEL (MSL) USING THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88)

200' 0 200'

Title:

WATER TABLE CONTOUR MAP MAY/JUNE 2008

OPERABLE UNIT 6 RI/FS REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:
AMTRAK

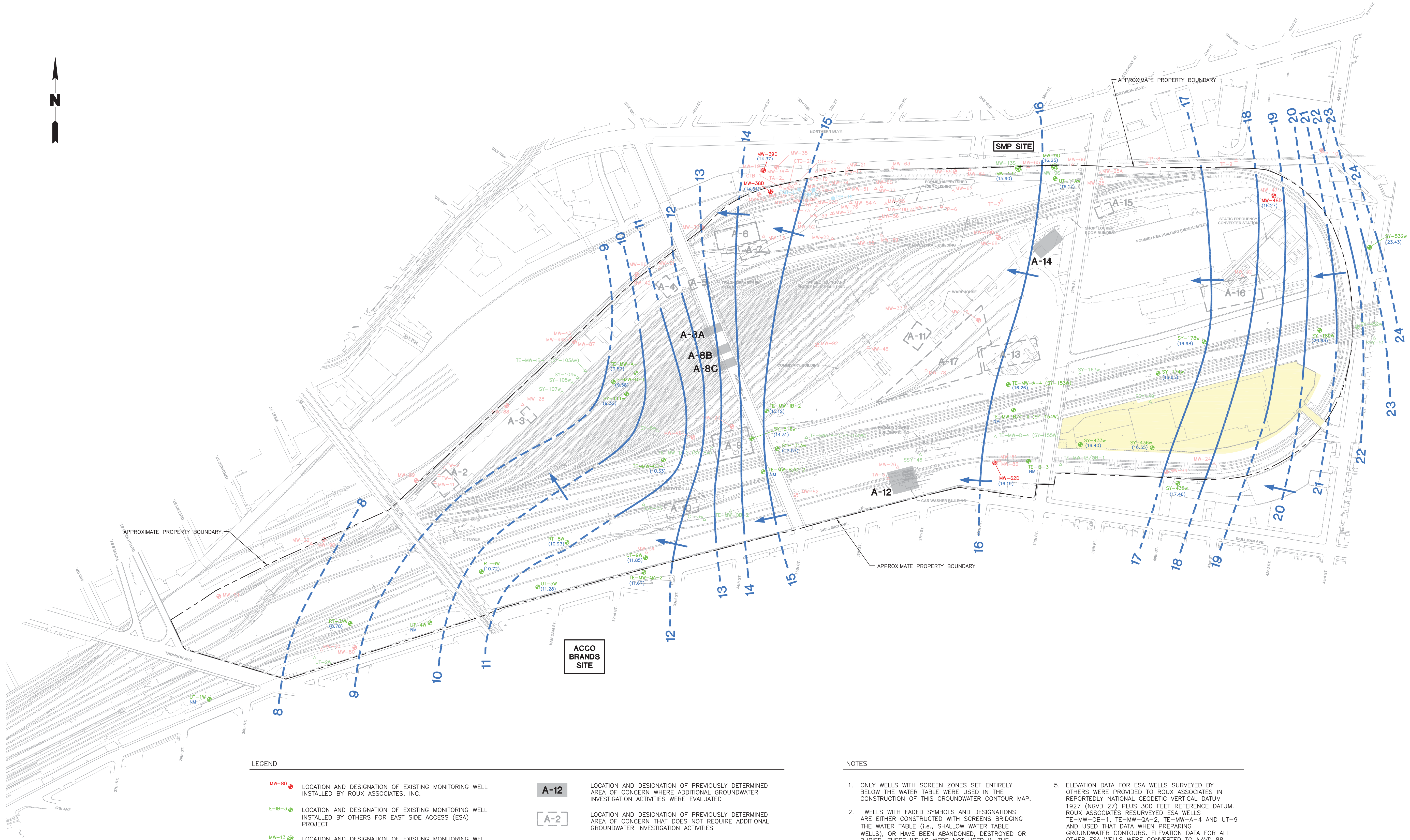
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: L.D.	Date: 16OCT09	PLATE
Prepared by: J.A.D.	Scale: AS SHOWN	2
Project Mgr: H.G.	Office: NY	
File No: AM6511302	Project: 05565Y03	

N:\PROJECTS\AM0550\AM0551\13\AM6511302.DWG

NEWT-0124192

Attachment 5



LEGEND

MW-80	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.
TE-IB-3	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY OTHERS FOR EAST SIDE ACCESS (ESA) PROJECT
MW-13	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL CLUSTER (CONTAINING ONE SHALLOW AND ONE DEEP MONITORING WELL) INSTALLED BY OTHERS AS PART OF THE RI/FS FOR THE STANDARD MOTOR PRODUCTS, INC. (SMP) SITE.
MW-31	LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC. THAT IS ABANDONED, DESTROYED, BURIED OR UNFIT FOR SAMPLING
TE-MW-OB-2	LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY OTHERS THAT IS ABANDONED, DESTROYED, BURIED OR UNFIT FOR SAMPLING
TSB-16	LOCATION AND DESIGNATION OF GEOPROBE™ SOIL BORINGS/ GROUNDWATER SAMPLING POINT FROM OU-3 REMEDIAL INVESTIGATION
	APPROXIMATE PROPERTY BOUNDARY
A-12	LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN WHERE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES WERE EVALUATED
A-2	LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN THAT DOES NOT REQUIRE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES
	PRIVATE PROPERTY NOT OWNED BY AMTRAK (NOT PART OF OU-6)
(8.78)	WATER TABLE ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
NM	NOT MEASURED
8	EQUIPOTENTIAL LINE FOR GROUNDWATER IN WELLS SCREENED ENTIRELY BELOW THE WATER TABLE, IN FEET RELATIVE TO MEAN SEA LEVEL, DASHED WHERE INFERRED
	DIRECTION OF GROUNDWATER FLOW

NOTES

1. ONLY WELLS WITH SCREEN ZONES SET ENTIRELY BELOW THE WATER TABLE WERE USED IN THE CONSTRUCTION OF THIS GROUNDWATER CONTOUR MAP.
2. WELLS WITH FADED SYMBOLS AND DESIGNATIONS ARE EITHER CONSTRUCTED WITH SCREENS BRIDGING THE WATER TABLE (i.e., SHALLOW WATER TABLE WELLS), OR HAVE BEEN ABANDONED, DESTROYED OR BURIED. THESE WELLS WERE NOT USED IN THE CONSTRUCTION OF THIS GROUNDWATER CONTOUR MAP.
3. EQUIPOTENTIAL LINES FOR GROUNDWATER IN WELLS SCREENED BELOW THE WATER TABLE WERE GENERALIZED USING DATA FROM EXISTING MONITORING WELLS INSTALLED BY ROUX ASSOCIATES, AND OTHERS.
4. ELEVATION DATA FOR WELLS SURVEYED BY ROUX ASSOCIATES IS IN FEET RELATIVE TO MEAN SEA LEVEL (MSL) USING THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
5. ELEVATION DATA FOR ESA WELLS SURVEYED BY OTHERS WERE PROVIDED TO ROUX ASSOCIATES IN REPORTEDLY NATIONAL GEODETIC VERTICAL DATUM 1927 (NGVD 27) PLUS 300 FEET REFERENCE DATUM. ROUX ASSOCIATES RESURVEYED ESA WELLS TE-MW-OB-1, TE-MW-QA-2, TE-MW-A-4 AND UT-9 AND USED THAT DATA WHEN PREPARING GROUNDWATER CONTOURS. ELEVATION DATA FOR ALL OTHER ESA WELLS WERE CONVERTED TO NAVD 88. GAUGING DATA FOR WELL SY-131AW WAS CONSIDERED ANOMALOUS AND NOT USED FOR GROUNDWATER CONTOURS.
7. GAUGING DATA FROM ESA WELLS UT-5W, RT-3AW, RT-6W AND RT-8W WAS COLLECTED IN MARCH AND APRIL SO ELEVATION CONTOURS ARE THEREFORE INFERRED.

200' 0 200'

Title:

EQUIPOTENTIAL MAP FOR GROUNDWATER IN WELLS SCREENED BELOW THE WATER TABLE JUNE/JULY 2008

OPERABLE UNIT 6 RI/FS REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

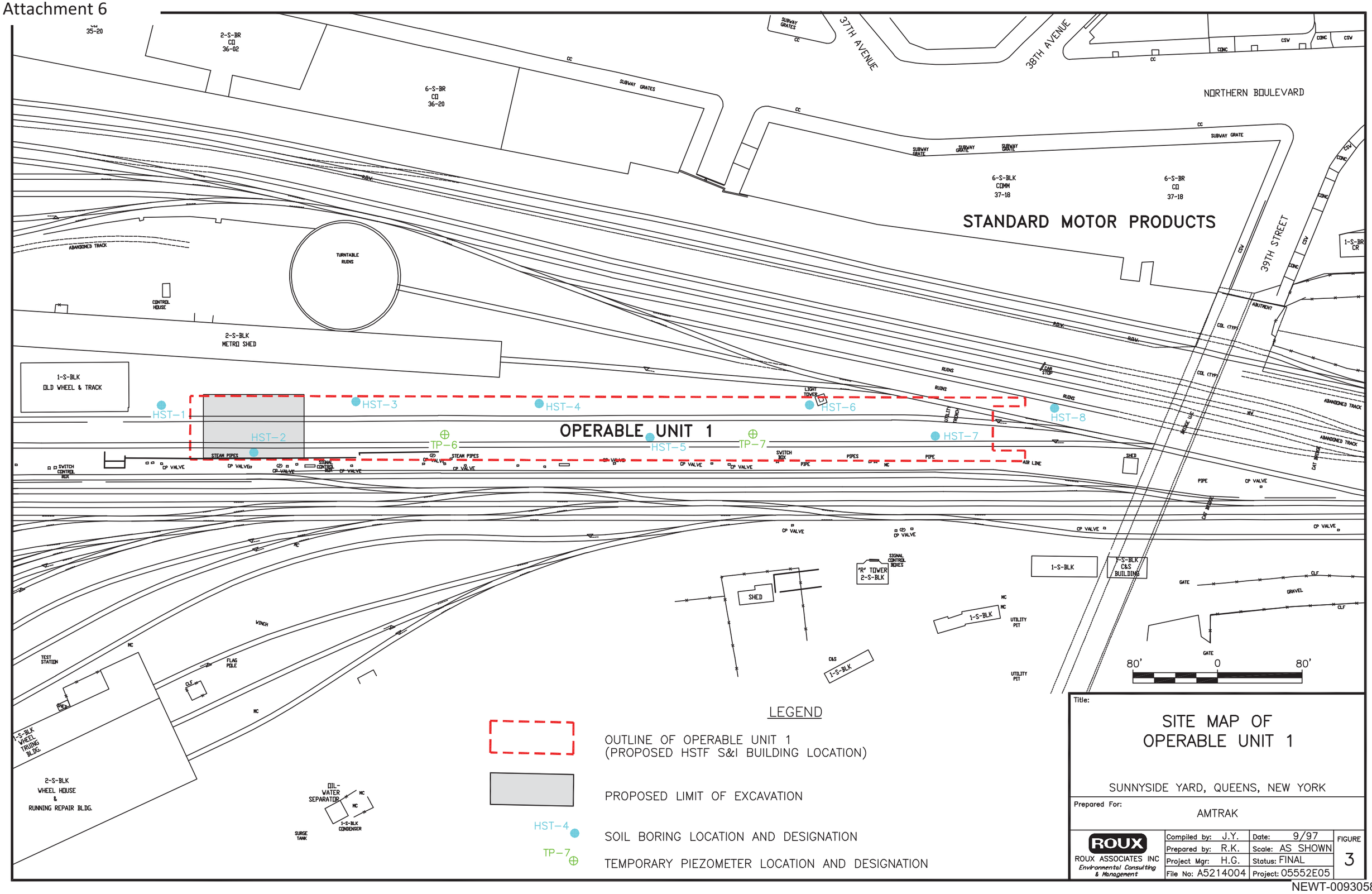
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: L.D.	Date: 16OCT09	PLATE
Prepared by: J.A.D.	Scale: AS SHOWN	3
Project Mgr: H.G.	Office: NY	
File No: AM6511303	Project: 05565Y03	

N:\PROJECTS\AM055Y\AM65Y\113\AM6511303.DWG

NEWT-0124193

Attachment 6



LEGEND

OUTLINE OF OPERABLE UNIT 1
(PROPOSED HSTF S&I BUILDING LOCATION)

PROPOSED LIMIT OF EXCAVATION

HST-4 SOIL BORING LOCATION AND DESIGNATION

TP-7 TEMPORARY PIEZOMETER LOCATION AND DESIGNATION

Title:

SITE MAP OF OPERABLE UNIT 1

SUNNYSIDE YARD, QUEENS, NEW YORK

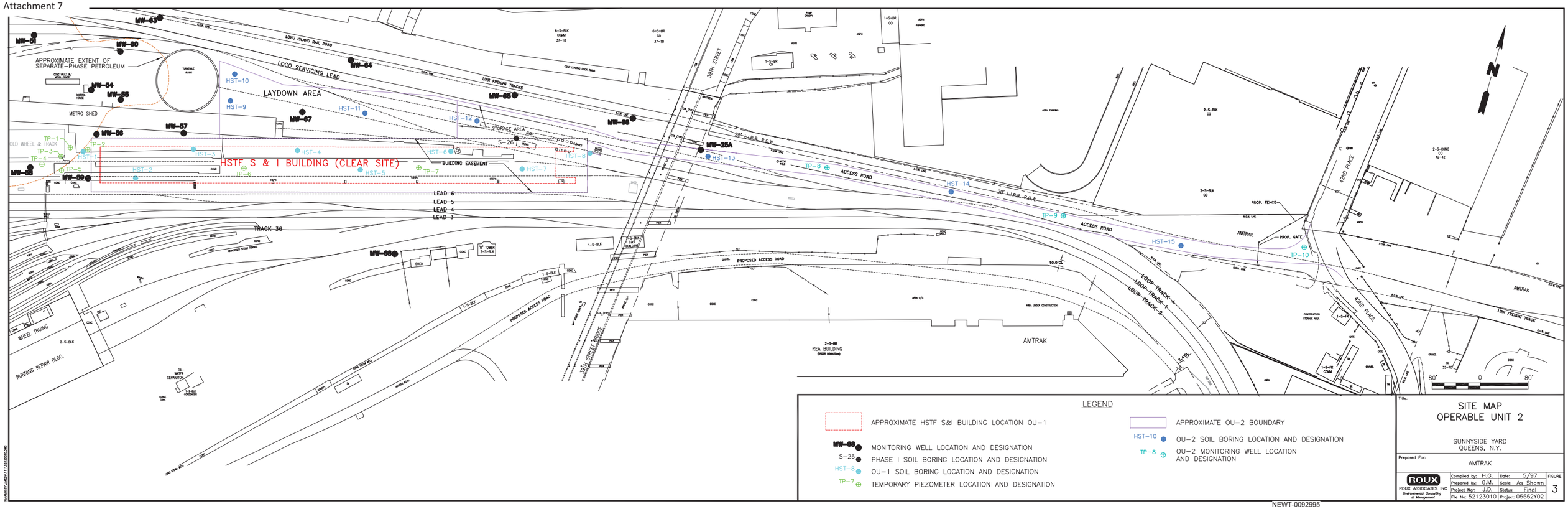
Prepared For:
AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: J.Y.	Date: 9/97	FIGURE
Prepared by: R.K.	Scale: AS SHOWN	3
Project Mgr: H.G.	Status: FINAL	
File No: A5214004	Project: 05552E05	

NEWT-0093058

Attachment 7



LEGEND

- APPROXIMATE HSTF S&I BUILDING LOCATION OU-1
- MW-65 MONITORING WELL LOCATION AND DESIGNATION
- S-26 PHASE I SOIL BORING LOCATION AND DESIGNATION
- HST-8 OU-1 SOIL BORING LOCATION AND DESIGNATION
- TP-7 TEMPORARY PIEZOMETER LOCATION AND DESIGNATION
- APPROXIMATE OU-2 BOUNDARY
- HST-10 OU-2 SOIL BORING LOCATION AND DESIGNATION
- TP-8 OU-2 MONITORING WELL LOCATION AND DESIGNATION

Title:

SITE MAP
OPERABLE UNIT 2

SUNNYSIDE YARD
QUEENS, N.Y.

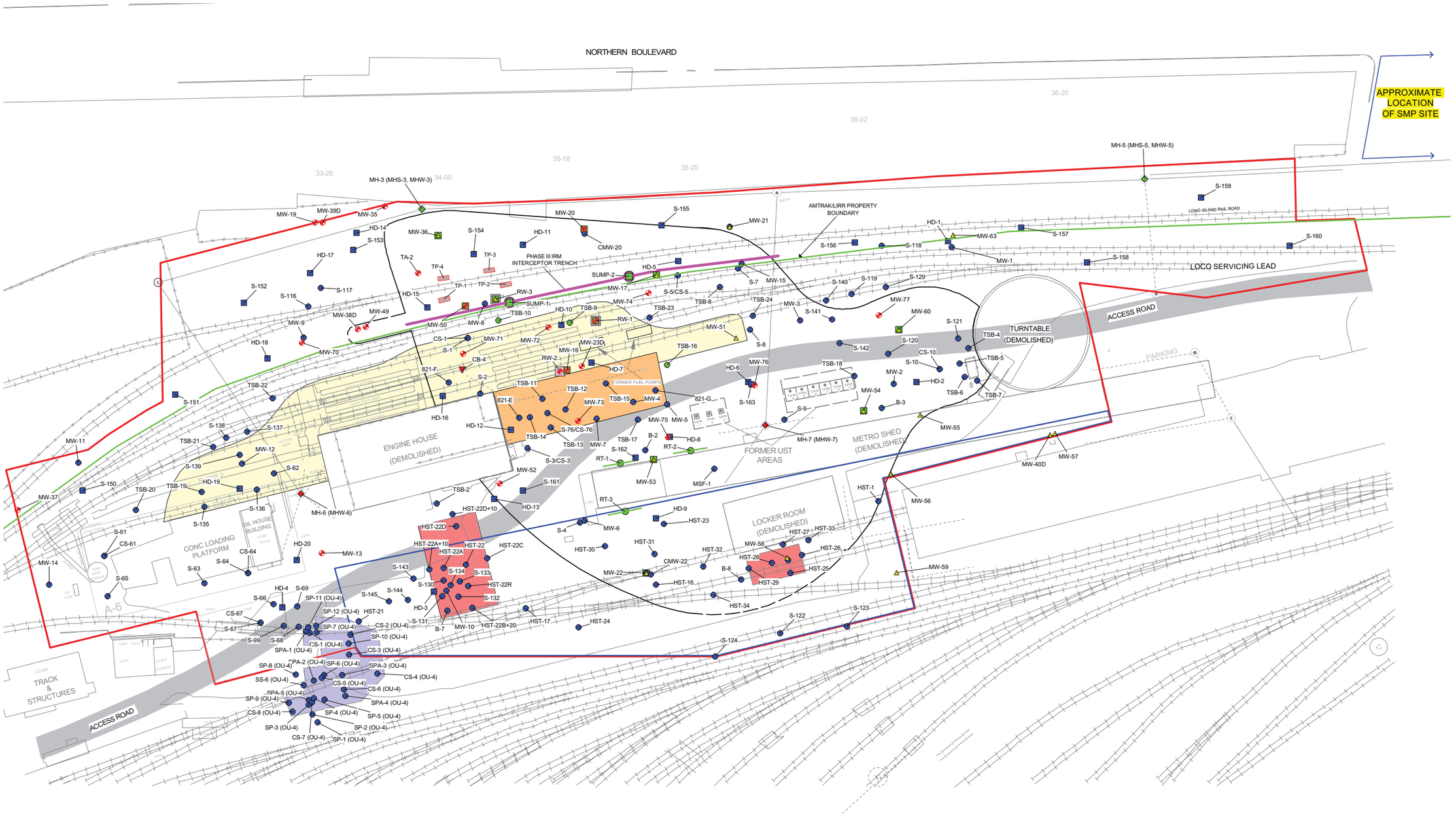
Prepared For:
AMTRAK

ROUX
ROUX ASSOCIATES INC.
Environmental Consulting & Management

Compiled by: H.G.	Date: 5/97	FIGURE
Prepared by: G.M.	Scale: As Shown	3
Project Mgr: J.D.	Status: Final	
File No: 52123010	Project: 05552Y02	

NEWT-0092995

Attachment 8



CS-1 — LOCATION AND DESIGNATION OF PREVIOUS SOIL BORING

TSB-9 — LOCATION AND DESIGNATION OF SOIL BORING AND TEMPORARY GEOPROBE GROUNDWATER SAMPLING POINT

HD-1 — LOCATION AND DESIGNATION OF SUPPLEMENTAL RI SOIL BORING

MW-50 — LOCATION AND DESIGNATION OF SPH SAMPLE

MHS-3 / MHW-3 — LOCATION AND DESIGNATION OF SEWER SEDIMENT ("S") AND WATER ("W") SAMPLE

MHW-6 — LOCATION AND DESIGNATION OF SEWER WATER SAMPLE

CB-4 — LOCATION AND DESIGNATION OF CATCH BASIN WATER SAMPLE

MW-16 — LOCATION AND DESIGNATION OF MONITORING WELL

MW-54 — LOCATION AND DESIGNATION OF FORMER MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.

RT-1 — LOCATION AND DESIGNATION OF PHASE I IRM RECOVERY TRENCH

RW-1 — LOCATION AND DESIGNATION OF PHASE II IRM RECOVERY WELLS

LOCATION OF PHASE III IRM INTERCEPTOR TRENCH

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

LOCATION AND DESIGNATION OF TEST PIT

SEWER LINE (DASHED WHERE INFERRED), WITH MANHOLE DESIGNATION (OU-5)

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

NOTES

IRM - INTERIM REMEDIAL MEASURE
SPH - SEPARATE-PHASE HYDROCARBON
OU-3 - OPERABLE UNIT 3
RI - REMEDIAL INVESTIGATION
HST - HIGH SPEED TRAINSET
SMP - STANDARD MOTOR PRODUCTS
LIRR - LONG ISLAND RAIL ROAD

N

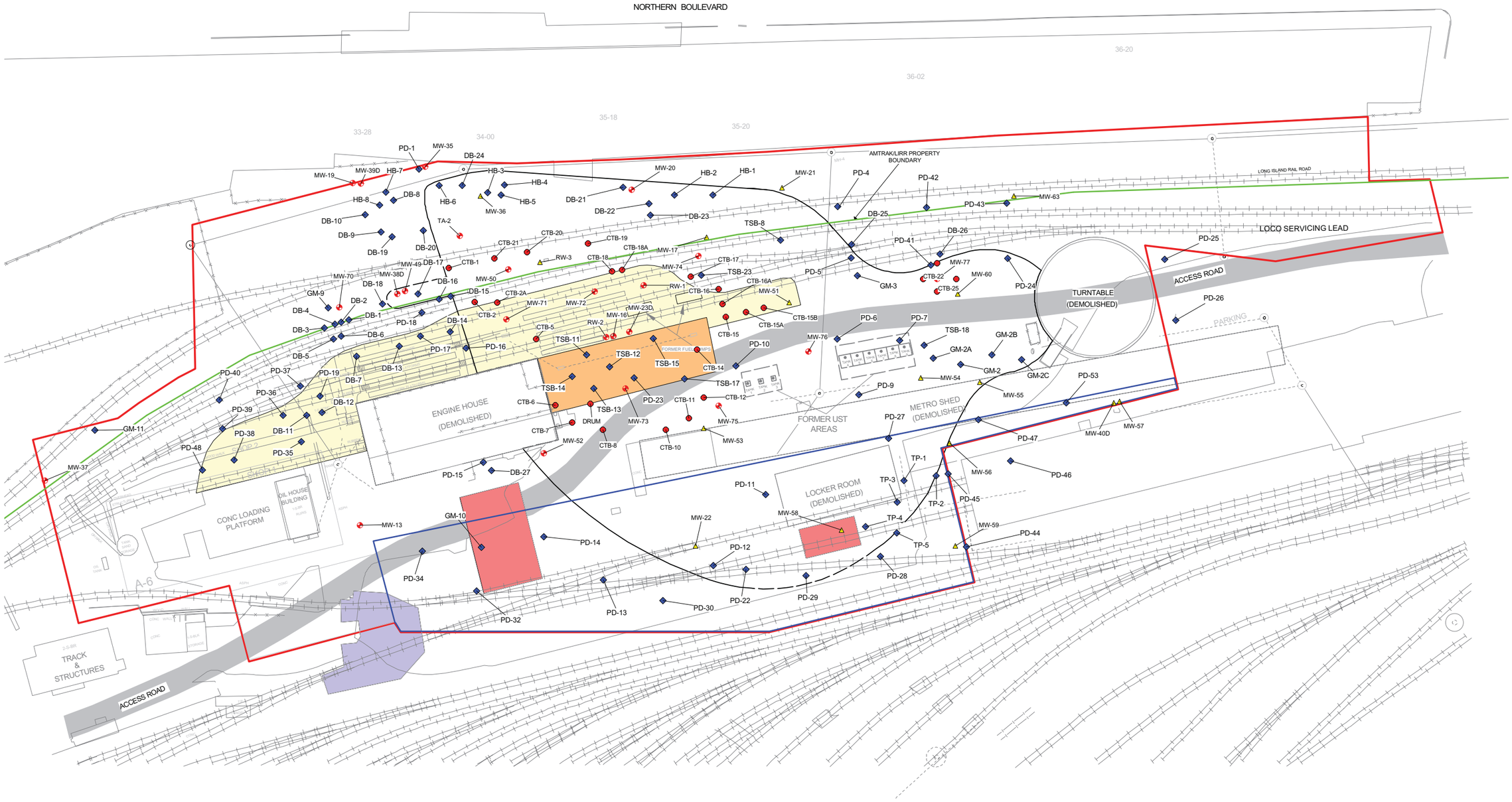
Title: SAMPLE LOCATIONS

SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES INC. Environmental Consulting & Management

Compiled by: RSK	Date: 11/2/2005	PLATE	
Prepared by: RSK	Scale: AS SHOWN		
Project Mgr: HC	Office: NY		2
File No.: AM451982	Project: 05545Y11		



CTB-1 LOCATION AND DESIGNATION OF PRE-DELINEATION OBSERVATION BORING

DB-18 LOCATION AND DESIGNATION OF HAND BORING COMPLETED FOR SPH DELINEATION PURPOSES

MW-16 LOCATION AND DESIGNATION OF MONITORING WELL

MW-54 LOCATION AND DESIGNATION OF FORMER MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

OU-3 BOUNDARY

LIMIT OF AREA PREVIOUSLY ADDRESSED DURING HST CONSTRUCTION

APPROXIMATE EXTENT OF VISUAL HYDROCARBON-IMPACTED SURFACE SOIL

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

NOTES

HB - HAND BORINGS COMPLETED IN 1991

PD - HAND BORINGS COMPLETED IN 1993

GM - HAND BORINGS COMPLETED IN 1993

TP - HAND BORINGS COMPLETED IN 1996

DB - HAND BORINGS COMPLETED IN 1999

TSB - BORINGS COMPLETED IN 2000

OU-3 - OPERABLE UNIT 3

RI - REMEDIAL INVESTIGATION

HST - HIGH SPEED TRAINSET

LIRR - LONG ISLAND RAIL ROAD

N

40' 0 40'

Title: SPH OBSERVATION BORINGS

SUNNYSIDE YARD, QUEENS, NEW YORK

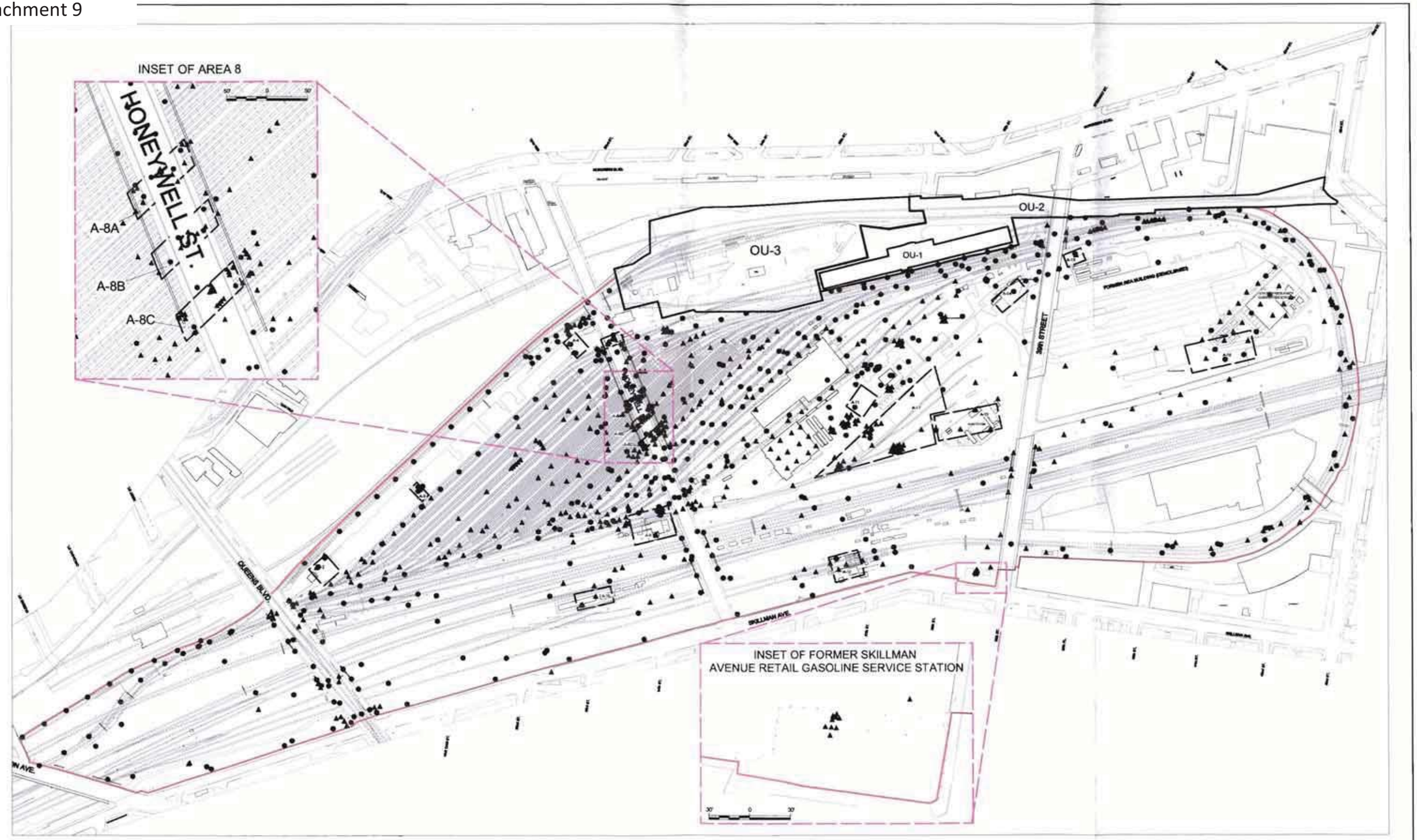
Prepared For: AMTRAK

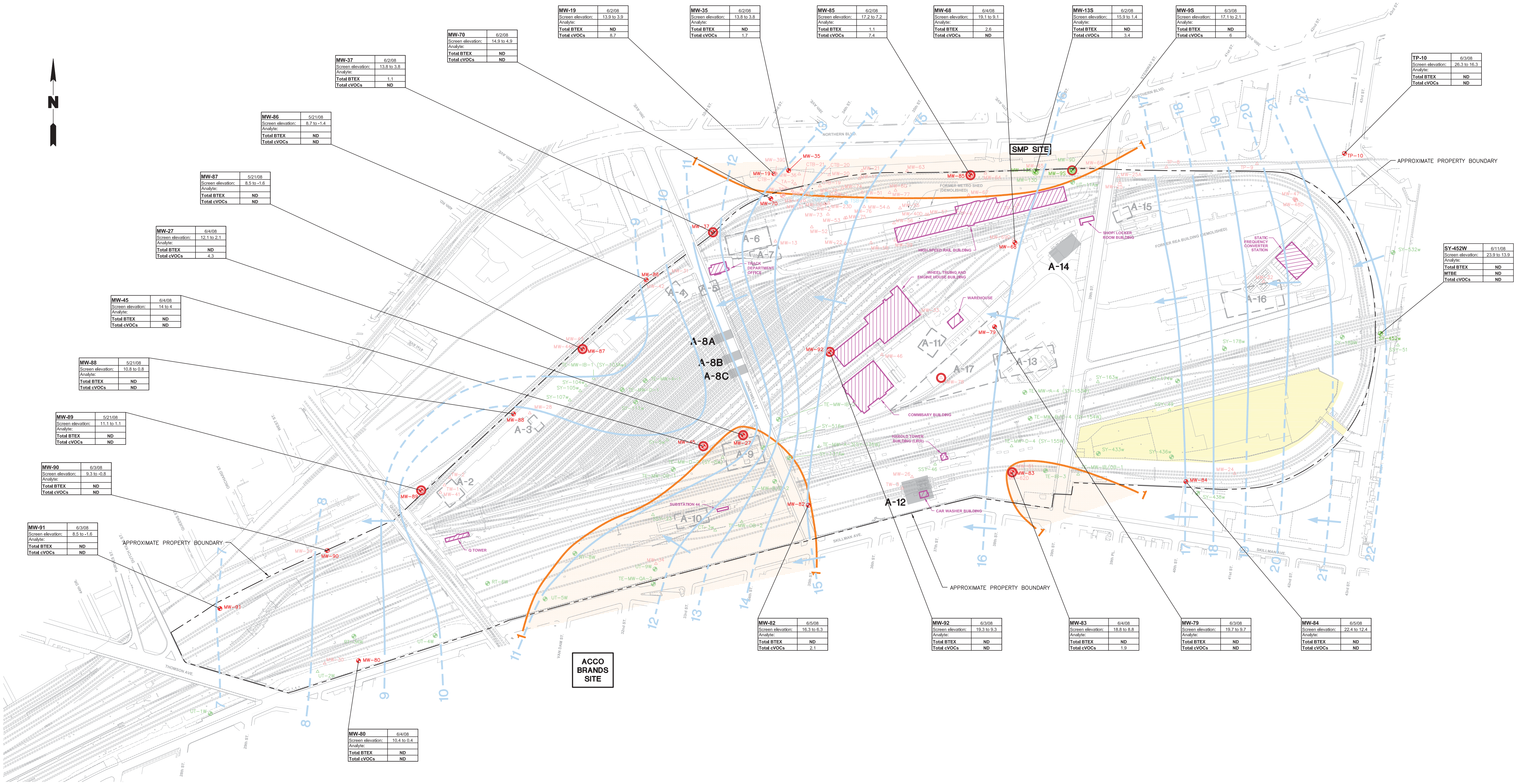
ROUX ASSOCIATES INC. Environmental Consulting & Management

Compiled by: RSK | Date: 11/2/2005
Prepared by: RSK | Scale: AS SHOWN
Project Mgr: HD | Office: NY
File No: AM451S803.WOR | Project: 05545Y11

PLATE 3

Attachment 9





Sample location	Sample date	Screen elevation	Total BTEX	MTBE	Total cVOCs
MW-19	6/2/08	13.9 to 3.9	ND		8.7
MW-35	6/2/08	13.8 to 3.8	ND		1.7
MW-85	6/2/08	17.2 to 7.2	1.1		7.4
MW-68	6/4/08	19.1 to 9.1	2.6		ND
MW-13S	6/2/08	15.9 to 1.4	ND		3.4
MW-9S	6/3/08	17.1 to 2.1	ND		6
MW-70	6/2/08	14.9 to 4.9	ND		ND
MW-37	6/2/08	13.8 to 3.8	1.1		ND
MW-86	5/21/08	8.7 to -1.4	ND		ND
MW-87	5/21/08	8.5 to -1.6	ND		ND
MW-27	6/4/08	12.1 to 2.1	ND		4.3
MW-45	6/4/08	14 to 4	ND		ND
MW-88	5/21/08	10.8 to 0.8	ND		ND
MW-89	5/21/08	11.1 to 1.1	ND		ND
MW-90	6/3/08	9.3 to -0.8	ND		ND
MW-91	6/3/08	8.5 to -1.6	ND		ND
MW-80	6/4/08	10.4 to 0.4	ND		ND
MW-82	6/5/08	16.3 to 6.3	ND		2.1
MW-92	6/3/08	19.3 to 9.3	ND		ND
MW-83	6/4/08	18.8 to 8.8	ND		1.9
MW-79	6/3/08	19.7 to 9.7	ND		ND
MW-84	6/5/08	22.4 to 12.4	ND		ND
TP-10	6/3/08	26.3 to 16.3	ND		ND
SY-452W	6/11/08	23.9 to 13.9	ND	ND	ND

LEGEND

MW-80 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.

TE-IB-3 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY OTHERS FOR EAST SIDE ACCESS (ESA) PROJECT

MW-13 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL CLUSTER (CONTAINING ONE SHALLOW AND ONE DEEP MONITORING WELL) INSTALLED BY OTHERS AS PART OF THE RI/FS FOR THE STANDARD MOTOR PRODUCTS, INC. (SMP) SITE.

MW-31 LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC. THAT IS ABANDONED, DESTROYED, BURIED OR UNFIT FOR SAMPLING

TE-MW-OB-2 LOCATION AND DESIGNATION OF MONITORING WELL INSTALLED BY OTHERS THAT IS ABANDONED, DESTROYED, BURIED OR UNFIT FOR SAMPLING

TSB-16 LOCATION AND DESIGNATION OF GEOPROBE™ SOIL BORINGS/ GROUNDWATER SAMPLING POINT FROM OU-3 REMEDIAL INVESTIGATION

MW-27 LOCATION AND DESIGNATION OF PROPOSED MONITORING WELL TO BE SAMPLED FOR REMEDIAL ALTERNATIVE II GROUNDWATER MONITORING PLAN

APPROXIMATE PROPERTY BOUNDARY

A-12 LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN WHERE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES WERE EVALUATED

A-2 LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN THAT DOES NOT REQUIRE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES

PRIVATE PROPERTY NOT OWNED BY AMTRAK (NOT PART OF OU-6)

8 ELEVATION OF WATER TABLE IN MAY AND JUNE 2008 IN FEET RELATIVE TO MEAN SEA LEVEL, DASHED WHERE INFERRED

DIRECTION OF GROUNDWATER FLOW

1 LINE OF EQUAL CONCENTRATION OF TOTAL CHLORINATED VOCs IN GROUNDWATER AT THE WATER TABLE IN MAY/JUNE 2008 IN UG/L

APPROXIMATE EXTENT OF TOTAL CHLORINATED VOCs IN GROUNDWATER AT THE WATER TABLE

INDICATES CURRENTLY OCCUPIED BUILDING (MINIMUM 8 HOURS) CONTINUOUS OCCUPANCY (AS OF AUGUST 2009)

INDICATES CURRENTLY OCCUPIED BUILDING (LESS THAN 8 HOURS) CONTINUOUS OCCUPANCY (AS OF AUGUST 2009)

SAMPLE LOCATION — SAMPLE DATE — SAMPLE DEPTH — ANALYTES — CONCENTRATIONS

MW-92	6/3/08
Screen elevation:	19.3 to 9.3
Analyte:	
Total BTEX	ND
Total cVOCs	ND

MTBE METHYL TERT-BUTYL ETHER

VOCs VOLATILE ORGANIC COMPOUNDS

CVOCs CHLORINATED VOLATILE ORGANIC COMPOUNDS

BTEX BENZENE, TOLUENE, ETHYLBENZENE AND XYLENES

ND ALL CVOCs OR BTEX NOT DETECTED

NOTES

1. ONLY GROUNDWATER QUALITY DATA GENERATED FROM WELLS SCREENED ACROSS THE WATER TABLE ARE PRESENTED ON THIS FIGURE.
2. WELLS WITH FADED SYMBOLS AND DESIGNATIONS ARE EITHER CONSTRUCTED WITH SCREENS SET ENTIRELY BELOW THE WATER TABLE (i.e., DEEP SCREEN ZONES), OR HAVE BEEN ABANDONED, DESTROYED OR BURIED. DEEP GROUNDWATER QUALITY DATA IS NOT PRESENTED ON THIS FIGURE.
3. ALL ELEVATION DATA IS IN FEET RELATIVE TO MEAN SEA LEVEL (MSL) USING THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88)
4. ALL DATA REPORTED IN MICROGRAMS PER LITER (ug/L).

200' 0 200'

Title:

GROUNDWATER QUALITY AT THE WATER TABLE MAY/JUNE 2008

OPERABLE UNIT 6 RI/FS REPORT
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: L.D.	Date: 11NOV09	PLATE
Prepared by: J.A.D.	Scale: AS SHOWN	4
Project Mgr: H.G.	Office: NY	
File No: AM6511304	Project: 05565Y03	

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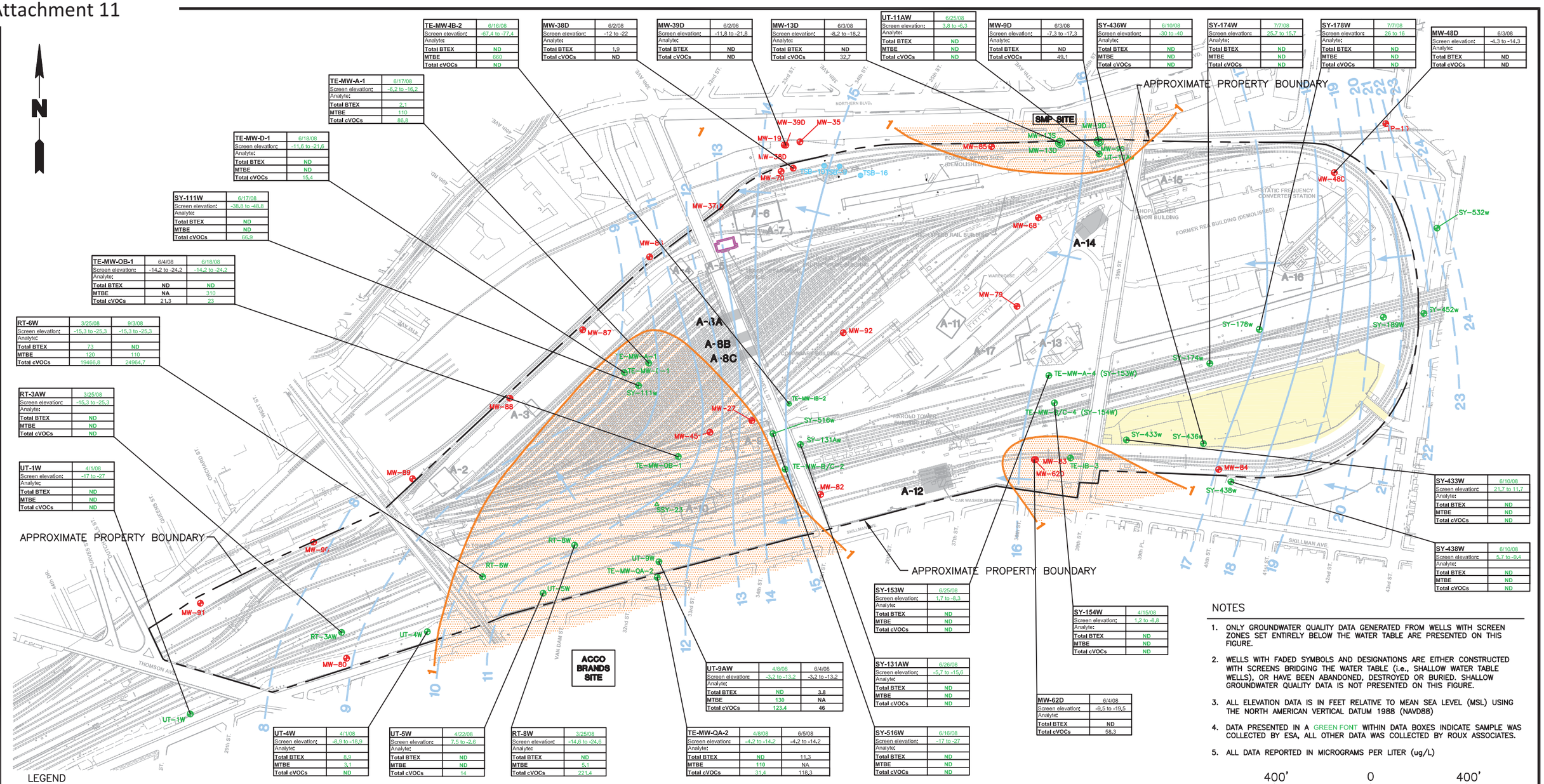
Attachment 11



TE-MW-IB-2	6/16/08
Screen elevation:	-67,4 to -77,4
Analyte:	
Total BTEX	ND
MTBE	660
Total cVOCs	ND

MW-38D	6/2/08
Screen elevation:	-12 to -22
Analyte:	
Total BTEX	1,9
Total cVOCs	ND

MW-39D	6/2/08
Screen elevation:	-11,8 to -21,8
Analyte:	
Total BTEX	ND
Total cVOCs	ND

MW-13D	6/3/08
Screen elevation:	-8,2 to -18,2
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	32,7

UT-11AW	6/25/08
Screen elevation:	3,8 to -6,3
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

MW-9D	6/3/08
Screen elevation:	-7,3 to -17,3
Analyte:	
Total BTEX	ND
Total cVOCs	49,1

SY-436W	6/10/08
Screen elevation:	-30 to -40
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

SY-174W	7/7/08
Screen elevation:	25,7 to 15,7
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

SY-178W	7/7/08
Screen elevation:	26 to 16
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

MW-48D	6/3/08
Screen elevation:	-4,3 to -14,3
Analyte:	
Total BTEX	ND
Total cVOCs	ND

TE-MW-A-1	6/17/08
Screen elevation:	-6,2 to -16,2
Analyte:	
Total BTEX	2,1
MTBE	110
Total cVOCs	86,8

TE-MW-D-1	6/18/08
Screen elevation:	-11,6 to -21,6
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	15,4

SY-111W	6/17/08
Screen elevation:	-38,8 to -48,8
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	66,9

TE-MW-OB-1	6/4/08	6/18/08
Screen elevation:	-14,2 to -24,2	-14,2 to -24,2
Analyte:		
Total BTEX	ND	ND
MTBE	NA	310
Total cVOCs	21,3	23

RT-6W	3/25/08	9/3/08
Screen elevation:	-15,3 to -25,3	-15,3 to -25,3
Analyte:		
Total BTEX	73	ND
MTBE	120	110
Total cVOCs	19466,8	24964,7

RT-3AW	3/25/08
Screen elevation:	-15,3 to -25,3
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

UT-1W	4/1/08
Screen elevation:	-17 to -27
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

SY-433W	6/10/08
Screen elevation:	21,7 to 11,7
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

SY-438W	6/10/08
Screen elevation:	5,7 to -9,4
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

SY-153W	6/25/08
Screen elevation:	1,7 to -8,3
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

SY-154W	4/15/08
Screen elevation:	1,2 to -8,8
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

UT-9AW	4/8/08	6/4/08
Screen elevation:	-3,2 to -13,2	-3,2 to -13,2
Analyte:		
Total BTEX	ND	3,8
MTBE	130	NA
Total cVOCs	123,4	46

SY-131AW	6/26/08
Screen elevation:	-5,7 to -15,6
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

MW-62D	6/4/08
Screen elevation:	-9,5 to -19,5
Analyte:	
Total BTEX	ND
Total cVOCs	58,3

UT-4W	4/1/08
Screen elevation:	-8,9 to -18,9
Analyte:	
Total BTEX	8,9
MTBE	3,1
Total cVOCs	ND

UT-5W	4/22/08
Screen elevation:	7,5 to -2,6
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	14

RT-8W	3/25/08
Screen elevation:	-14,6 to -24,6
Analyte:	
Total BTEX	ND
MTBE	5,1
Total cVOCs	221,4

TE-MW-QA-2	4/8/08	6/5/08
Screen elevation:	-4,2 to -14,2	-4,2 to -14,2
Analyte:		
Total BTEX	ND	11,3
MTBE	110	NA
Total cVOCs	31,4	118,3

SY-516W	6/16/08
Screen elevation:	-17 to -27
Analyte:	
Total BTEX	ND
MTBE	ND
Total cVOCs	ND

NOTES

1. ONLY GROUNDWATER QUALITY DATA GENERATED FROM WELLS WITH SCREEN ZONES SET ENTIRELY BELOW THE WATER TABLE ARE PRESENTED ON THIS FIGURE.
2. WELLS WITH FADED SYMBOLS AND DESIGNATIONS ARE EITHER CONSTRUCTED WITH SCREENS BRIDGING THE WATER TABLE (i.e., SHALLOW WATER TABLE WELLS), OR HAVE BEEN ABANDONED, DESTROYED OR BURIED. SHALLOW GROUNDWATER QUALITY DATA IS NOT PRESENTED ON THIS FIGURE.
3. ALL ELEVATION DATA IS IN FEET RELATIVE TO MEAN SEA LEVEL (MSL) USING THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88)
4. DATA PRESENTED IN A GREEN FONT WITHIN DATA BOXES INDICATE SAMPLE WAS COLLECTED BY ESA, ALL OTHER DATA WAS COLLECTED BY ROUX ASSOCIATES.
5. ALL DATA REPORTED IN MICROGRAMS PER LITER (ug/L)

400' 0 400'

LEGEND

- MW-80 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.
- TE-IB-3 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL INSTALLED BY OTHERS FOR EAST SIDE ACCESS (ESA) PROJECT
- MW-13 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL CLUSTER (CONTAINING ONE SHALLOW AND ONE DEEP MONITORING WELL) INSTALLED BY OTHERS AS PART OF THE RI/FS FOR THE STANDARD MOTOR PRODUCTS, INC. (SMP) SITE.
- TSB-16 — LOCATION AND DESIGNATION OF GEOPROBE™ SOIL BORINGS/ GROUNDWATER SAMPLING POINT FROM OU-3 REMEDIAL INVESTIGATION
- 8 — EQUIPOTENTIAL LINE FOR GROUNDWATER IN WELLS SCREENDED ENTIRELY BELOW THE WATER TABLE, IN FEET RELATIVE TO MEAN SEA LEVEL, DASHED WHERE INFERRED
- DIRECTION OF GROUNDWATER FLOW
- APPROXIMATE PROPERTY BOUNDARY
- A-12 — LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN WHERE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES WERE EVALUATED
- A-2 — LOCATION AND DESIGNATION OF PREVIOUSLY DETERMINED AREA OF CONCERN THAT DOES NOT REQUIRE ADDITIONAL GROUNDWATER INVESTIGATION ACTIVITIES
- PRIVATE PROPERTY NOT OWNED BY AMTRAK (NOT PART OF OU-6)
- APPROXIMATE EXTENT OF TOTAL CHLORINATED VOCs IN WELLS SCREENED ENTIRELY BELOW THE WATER TABLE
- 1 — LINE OF EQUAL CONCENTRATION OF TOTAL CHLORINATED VOCs IN WELLS SCREENED ENTIRELY BELOW THE WATER TABLE IN ug/L

SAMPLE LOCATION — SAMPLE DATE

SY-154W	4/15/08
Screen elevation:	1,2 to -8,8 — SAMPLE DEPTH
Analyte:	
Total BTEX	ND — CONCENTRATIONS
MTBE	ND
Total cVOCs	ND

ANALYTES

- MTBE — METHYL TERT-BUTYL ETHER
- VOCs — VOLATILE ORGANIC COMPOUNDS
- CVOCs — CHLORINATED VOLATILE ORGANIC COMPOUNDS
- BTEX — BENZENE, TOLUENE, ETHYLBENZENE AND XYLENES
- ND — ALL CVOCs OR BTEX NOT DETECTED
- NA — NOT ANALYZED

Title:

GROUNDWATER QUALITY IN WELLS SCREENED BELOW THE WATER TABLE APRIL THROUGH JUNE 2008

OPERABLE UNIT 6 RECORD OF DECISION
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

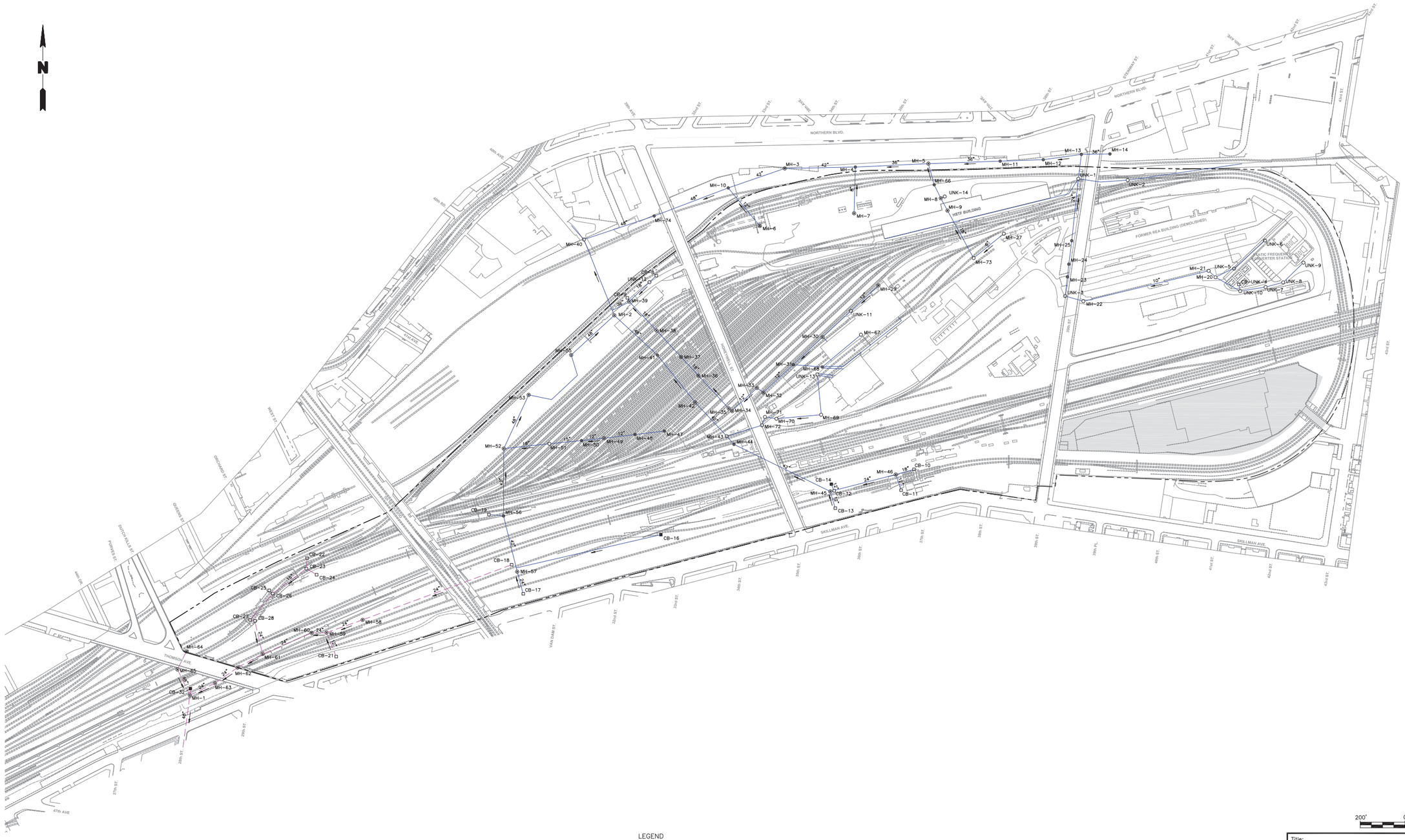
AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting and Management

Compiled by: L.D.	Date: 12MAR10	FIGURE
Prepared by: J.A.D.	Scale: AS SHOWN	8
Project Mgr: H.G.	Project: 05565Y04	
File: AM6511907		

N:\PROJECTS\AM055Y\AM65Y\119\AM6511907.DWG

Attachment 12



LEGEND

PRIMARY SEWER SYSTEM (COMBINED SEWER SYSTEM)	MH-2 ○ LOCATION AND DESIGNATION OF SEWER MANHOLE WITH GRATE COVER
SECONDARY SEWER SYSTEM (STORM SEWER SYSTEM)	MH-5 ◎ LOCATION AND DESIGNATION OF SEWER MANHOLE WITH SOLID COVER
APPROXIMATE PROPERTY BOUNDARY	MH-66 ● LOCATION AND DESIGNATION OF SEWER MANHOLE NOT LOCATED OR COMPLETELY BURIED
PRIVATE PROPERTY NOT OWNED BY AMTRAK	CB-18 □ LOCATION AND DESIGNATION OF CATCH BASIN
UNK MANHOLE LOCATED IN THE FIELD BUT NOT SHOWN IN AVAILABLE SEWER MAPS	CB-14 ■ LOCATION AND DESIGNATION OF CATCH BASIN NOT LOCATED OR COMPETELY BURIED

200′ 0 200′

Title:

SEWER SYSTEM BASEMAP

OPERABLE UNIT 5 REMEDIAL INVESTIGATION WORK PLAN
SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: L.O.	Date: 11MAY10	PLATE	
Prepared by: J.A.D.	Scale: AS SHOWN		1
Project Mgr: H.G.	Office: NY		
File No: AM5011901	Project: 05550Y05		

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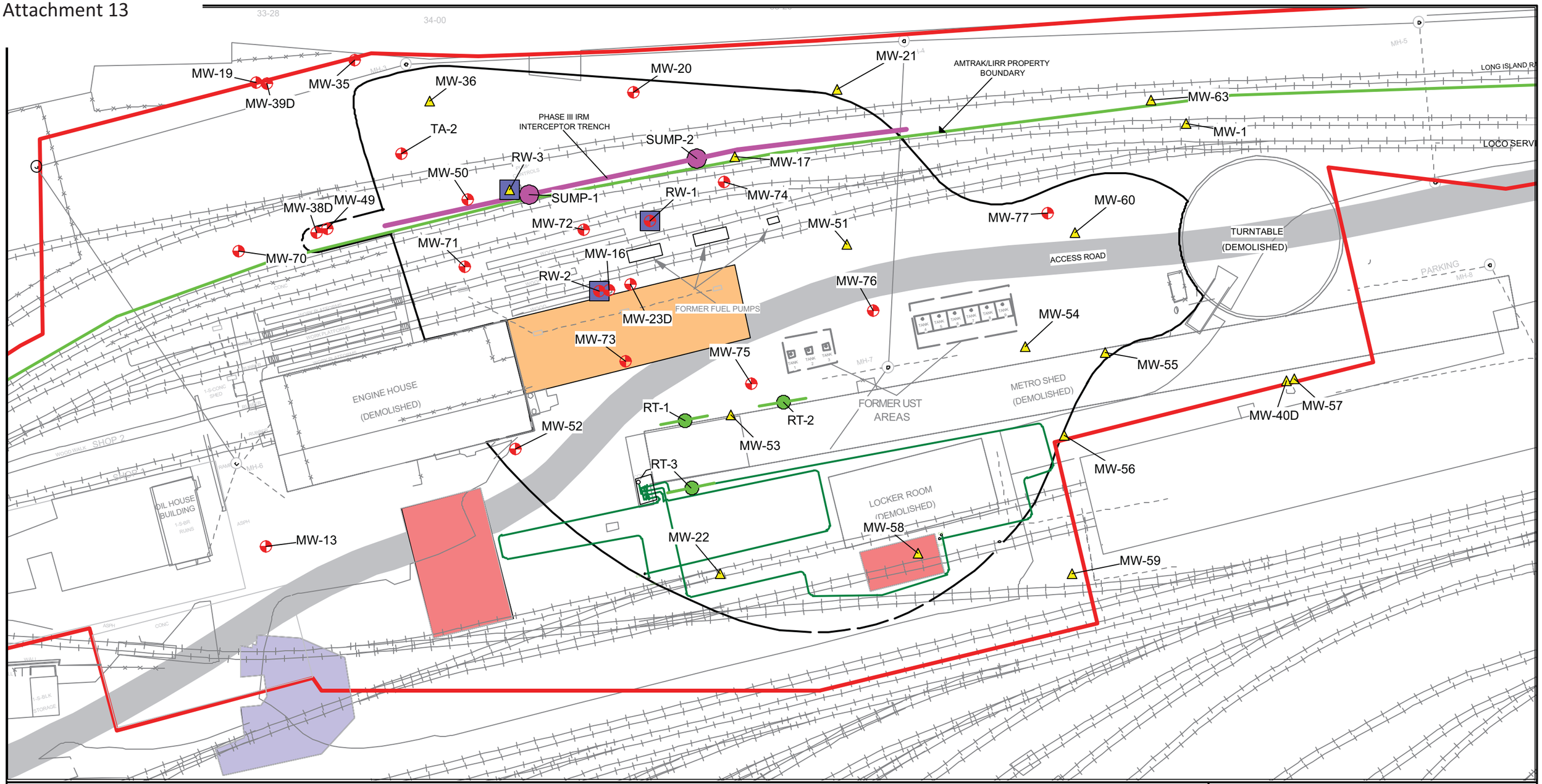
Attachment 13



RT-1 — LOCATION AND DESIGNATION OF PHASE I IRM RECOVERY TRENCH (SUMPS SHOWN)

RW-1 — LOCATION AND DESIGNATION OF PHASE II IRM RECOVERY WELLS

LOCATION OF PHASE III IRM INTERCEPTOR TRENCH (SUMPS SHOWN)

MW-54 — LOCATION AND DESIGNATION OF FORMER (ABANDONED OR DESTROYED) MONITORING WELL INSTALLED BY ROUX ASSOCIATES, INC.

MW-16 — LOCATION AND DESIGNATION OF MONITORING WELL

AREA REMEDIATED TO 0.5 FT BELOW HISTORIC GRADE (1985-1986)

AREA REMEDIATED TO 2 FT BELOW HISTORIC GRADE (1998)

AREA REMEDIATED TO BETWEEN 3 AND 8 FT BELOW HISTORIC GRADE (1999)

APPROXIMATE BOUNDARY OF HISTORIC SPH PLUME (ZERO CONTOUR)

OU-3 BOUNDARY

BIOINFILTRATION PIPING

NOTES

IRM - INTERIM REMEDIAL MEASURE

SPH - SEPARATE-PHASE HYDROCARBON

OU-3 - OPERABLE UNIT 3

RI - REMEDIAL INVESTIGATION

LIRR - LONG ISLAND RAIL ROAD

60' 0 60'

N

Title:

LOCATIONS OF PREVIOUS AND EXISTING SPH IRMs AND SOIL IRMs

SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 11/4/2005	FIGURE 11
Prepared by: RSK	Scale: SHOWN	
Project Mgr: HG	Office: NY	
File No: AM4519810.WOR	Project: 05545Y11	